MACHINERY

JUNE 7, 1961 ONE SHILLING & THREEPENCE

ESSA

AUTOMATIC PRESSES

Models BHA 30, 60, 120, 180t.

✳ Give several times more blanks per regrind

plus ONLY HALF GRIND-OFF ALLOWANCE FROM DIE SURFACE

equals MANY TIMES LONGER TOOL LIFE

VAUGHAN

ASSOCIATES LIMITED

4 QUEEN ST · CURZON ST · LONDON, W.1.

Telephone: GROSVENOR 8362-5

Midland Office and Demonstration Room

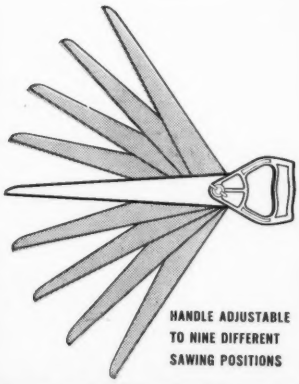
WILFORD CRESCENT NOTTINGHAM

Telephone: NOTTINGHAM 88008

Photograph by courtesy of Woods of Colchester Ltd, shows the blanking of rotor and stator laminations

For any job—
WOOD, METAL, PLASTIC ETC.
it cuts through the lot

Here's a saw which will cut both wood AND metal — *one* saw for all the odd jobs about the house, the farm, the garden, the building site and so on. If the "odd job" is the cutting of hard wood, soft wood, wood in which nails or bolts are embedded, hard rubber, plastics, fibreboard, the every-day range of pipes and bars made from mild steel, copper, brass, aluminium, lead and the like, here's the saw that will cut through the lot! The blade can be adjusted for sawing in almost any position.



HANDLE ADJUSTABLE TO NINE DIFFERENT SAWING POSITIONS

* Price
15/6

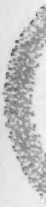
Eclipse

general purpose saw

Made by James Neill & Co. (Sheffield) Ltd., and obtainable from hardware and tool dealers

S.SA. 12

VOLUNTEER



co
as
su
in
pr
in
Re
cu
pe
eq
se
me

Sel

WI
ELECFU

"These Wild-Barfield furnaces do a really good job"

Where heat-treatment is concerned—are you doing the job as economically as possible? It's surprising the number of people who invest in expensive machine tools for production—and then spoil a good job in outdated furnaces. And the result? Rejects—time, money and probably customer goodwill lost. More and more people are relying on Wild-Barfield equipment. Write for full details and see how you can save by changing to modern electric furnaces.

Self-contained Electrode Salt Bath ESB 346.
Standard Model delivery ex stocks

WILD BARFIELD

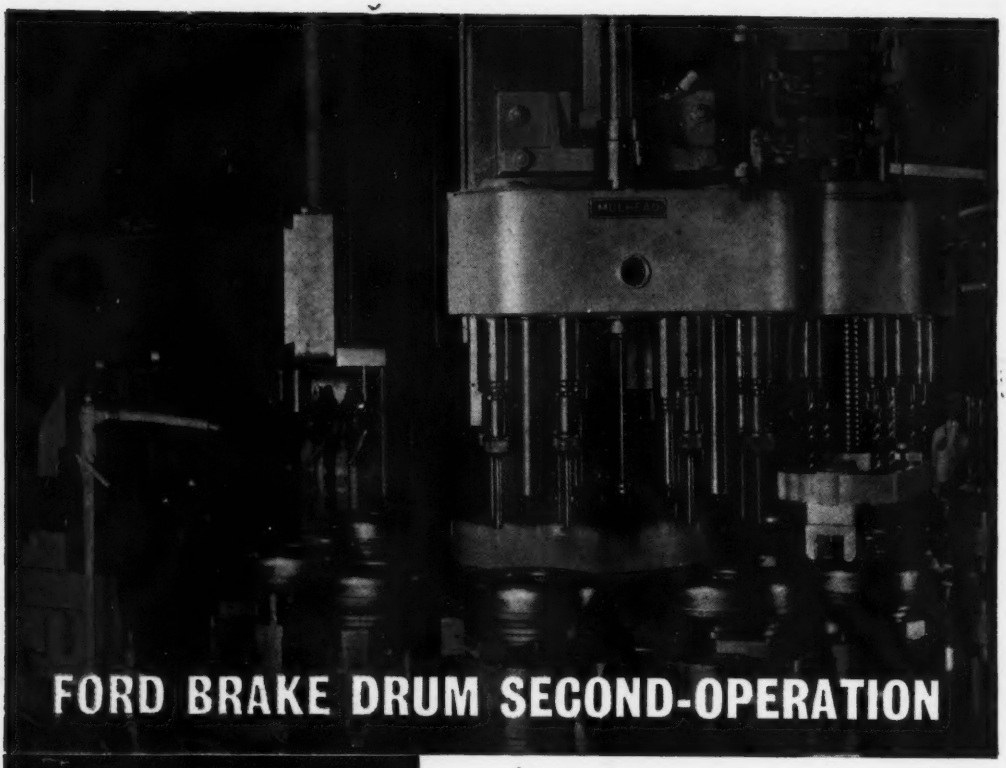
ELECTRIC FURNACES
FOR ALL HEAT TREATMENT PURPOSES
Backed by 40 years specialist experience

WILD-BARFIELD ELECTRIC FURNACES LIMITED

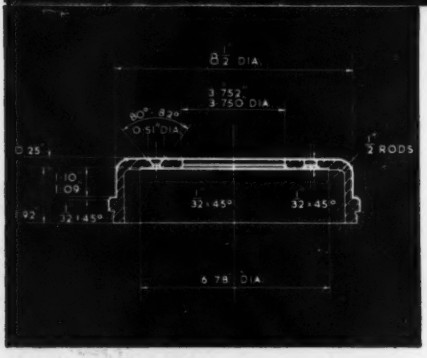
ELECFURN WORKS, OTTERSPOOL WAY, WATFORD BY-PASS, WATFORD, HERTS. Tel: Watford 26091 (8 lines) Grams: Elecfurn, Watford WB71

When answering advertisements kindly mention MACHINERY.

A



FORD BRAKE DRUM SECOND-OPERATION



MACHINED IN 40 SECONDS

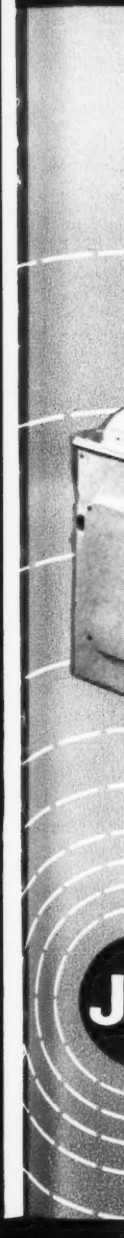
The use of special Mulhead multi-drill heads on the Ryder Verticalauto enables drilling, reaming, countersinking and back-chamfering operations to be performed in addition to standard boring and facing work.

The second operation on this Ford Brake Drum is completed at very high output rates on this 12-spindle No. 10 Ryder Verticalauto.

Ryder ***VERTICALAUTO***

Thos. Ryder & Son, Limited, Turner Bridge Works, Bolton, England.
Makers also of single spindle Rydermatics and Piston Ring Lathes.

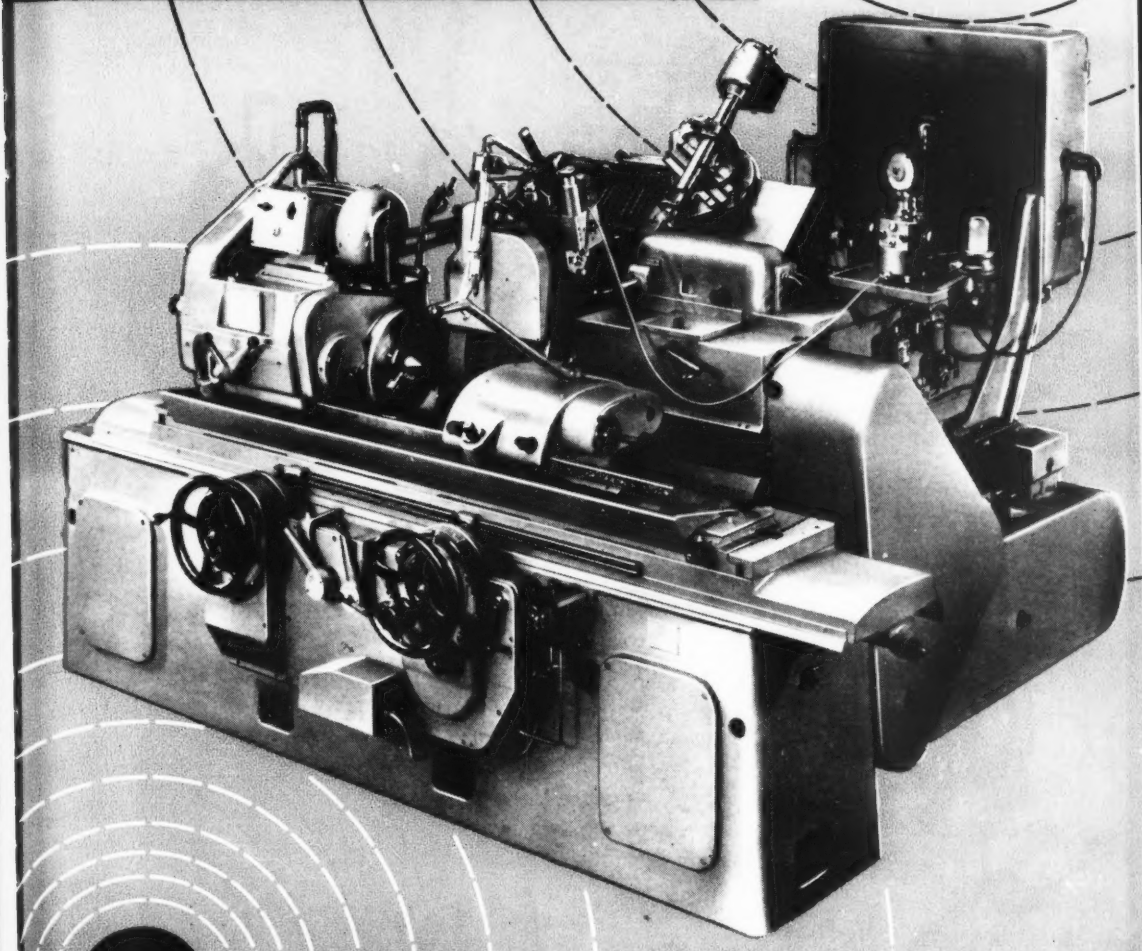
LA



LA PRODUCTION CYLINDRICAL GRINDERS

STANDARD AND FULLY AUTOMATIC MACHINES IN THE SIZE RANGE 12″ x 24″ TO 16″ x 120″

NEWALL
ESTABLISHED IN 190

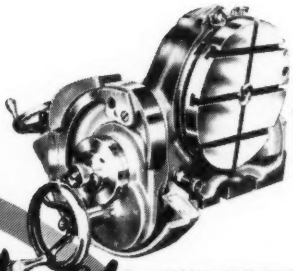


JIC BUILT THROUGHOUT TO J.I.C. STANDARDS

NEWALL GROUP SALES LIMITED

PETERBOROUGH · TELEPHONE 3227

HAND OPERATED
PLAIN TYPES

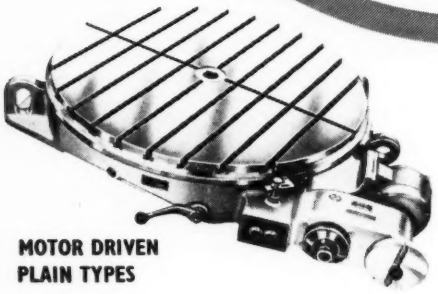


HAND OPERATED
TILTING TYPES

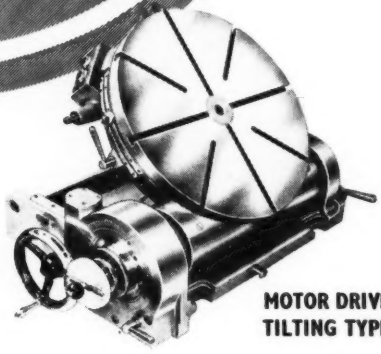
Pratt & Whitney

PRECISION ROTARY TABLES

FIRST CHOICE FOR PRECISE
CIRCULAR SPACING AND
ANGULAR POSITIONING



MOTOR DRIVEN
PLAIN TYPES



MOTOR DRIVEN
TILTING TYPES

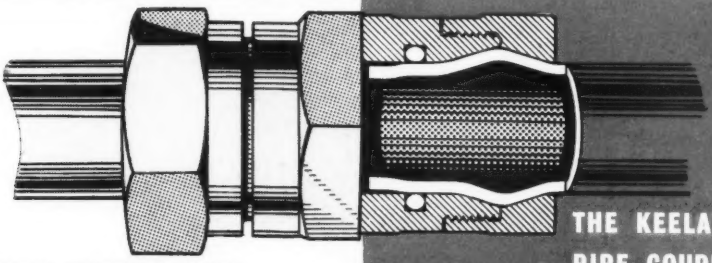
BUCK & HICKMAN LTD – OTTERSPOOL WAY – WATFORD BY-PASS – HERTS

HEAD OFFICE
P.O. BOX 74 WHITECHAPEL ROAD
LONDON, E.1.

BRANCHES
ALPERTON — BIRMINGHAM — BRISTOL
GLASGOW — LEEDS — MANCHESTER

KEELAVITE
Hydraulics

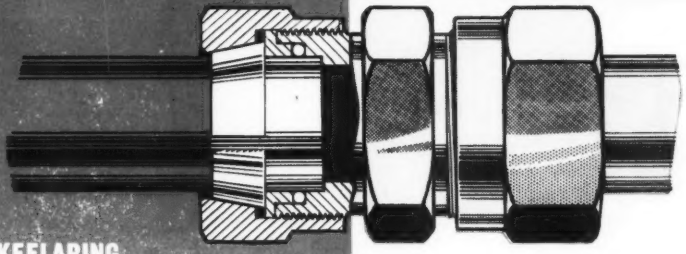
HIGH-PRESSURE PIPE COUPLINGS



Keelavite, the recognised authority on hydraulic power transmission, needed high-pressure pipe couplings to meet the high standards required for their successful hydraulic installations, result The KeelaTite and the Keelaring Couplings.

THE KEELATITE PIPE COUPLING

The KeelaTite coupling provides a simple safe and sure way for speedy hydraulic pipework. Absolute reliability under steady and fluctuating pressures. Tube-end is formed hydraulically by a quick and effortless operation.



THE KEELARING PIPE COUPLING

The new Keelaring coupling is a collet-type joint consisting of five separate pieces which when assembled force the sealing ring into a tapered recess and thus provide a leak proof seal. Standard tools give adequate tightening with no damage to tube ends. 100% reusable.

Each coupling has its special characteristics and uses, but both are equally successful. Designed to provide perfect sealing and to withstand vibration.

THE RECOGNISED AUTHORITY ON HYDRAULIC POWER TRANSMISSION

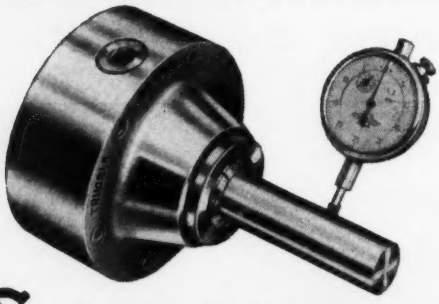
KEELAVITE
Hydraulics

For full details of these couplings write to

KEELAVITE HYDRAULICS LTD, ALLESLEY, COVENTRY

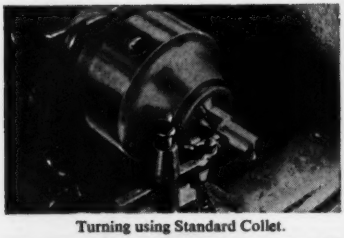
Telephone: Meriden 441

9 Applications to the Crawford "TRUGRIP" COLLET CHUCK



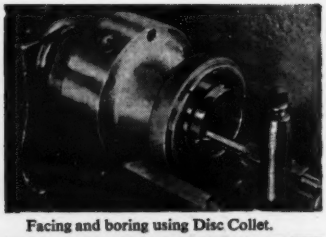
Sizes: 5in. dia., 1in. capacity;
7in. dia., 2in. capacity

With the Crawford "Trugrip" Collet Chuck, work is held true, instantly, by the turn of a key. Absence of drawtube or sleeve means that full bore of spindle can be used. Powerful, positive action, with no distortion, and no marking of previously machined surfaces, makes it ideal for second operation work. Wide range of collets greatly increases capacity of machine, nine typical examples shown below.

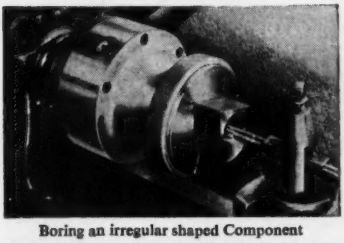


Turning using Standard Collet.

Facing and turning using Ring Collet.

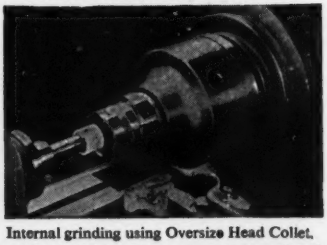


Facing and boring using Disc Collet.

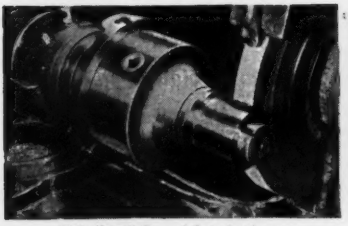


Boring an irregular shaped Component

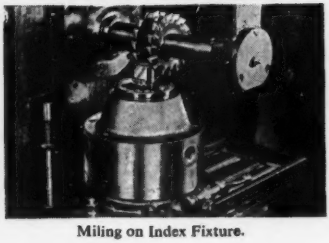
Grinding using Standard Collet.



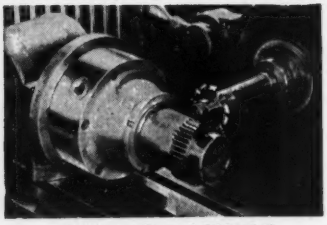
Internal grinding using Oversize Head Collet.



Grinding O.D. and face dead true with bore using Expanded Mandrel.



Miling on Index Fixture.



Milling on Expanded Mandrel.

CRAWFORD COLLETS LIMITED

WITNEY · OXON · TELEPHONE WITNEY 334

London Stockists: Acbars Limited, 16-18, Macleod Street, Walworth Road, S.E.17. Tel: RODney 7191
Midland & N W England Stockists: Retselp Engineering Ltd., Vulcan Road, Industrial Site, Lode Lane, Solihull, Birmingham. Tel: Solihull 2239
Agents for North East England: Messrs. Alfred Herbert Ltd., Carliol Square, Newcastle, 1. Tel: NEWcastle 28864
Agents for Scotland: R. McSkimming & Co., 65, West Regent Street, Glasgow. C.2. Tel: DOUglas 7391-2 C3

ABW
Telepho

ABWOOD

HIGH PRECISION
TOOL & DIE SURFACE GRINDER
MODEL SG-4H

HYDRAULICALLY OPERATED

RAPID POWER ELEVATION OF KNEE

HIGH PRODUCTION WITH VERSATILITY

SENSITIVE CONTROLS WITH RUN OUT TO LOADING POSITION

Automatic in-feed for depth of cut in .0002in. steps.

Pressure lubricated completely covered slideways.

Hydraulic reservoir and pump housed in base.

Large capacity mobile coolant tank with removable sludge tray.

Segmental chuck available for maximum stock removal.

Built to Schlesinger limits.

Finishes to 1.5 micro inches on suitable materials.

Manual table traverse for use with Cutter Grinding Attachment.

ABWOOD MACHINE TOOLS LTD., PRINCES ROAD, DARTFORD, KENT

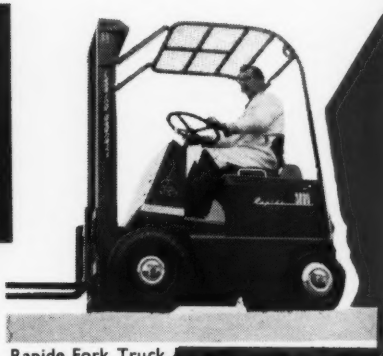
Telephone: Dartford 25271 (5 lines)

Telegrams: ABWOOD DARTFORD

PEAK KEEPS

Precision-made components by Peak Engineering have contributed to the efficiency of modern transport.

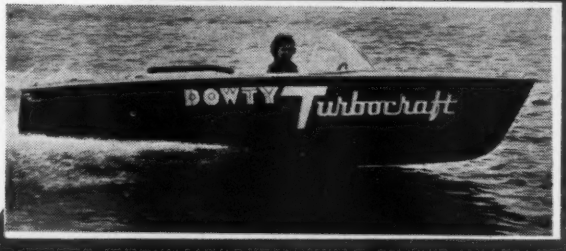
De Havilland Comet by permission of 'Flight'



Rapide Fork Truck
Bagnall Ltd.

Land-Rover by permission of The Rover Co. Ltd.

Centurion Tank



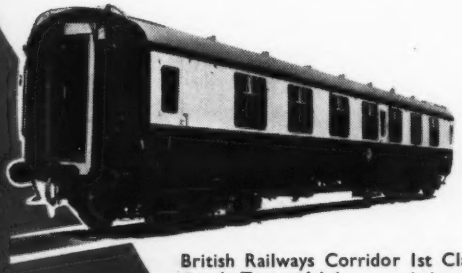
Standard model Turbocraft by permission of Dowty Marine Ltd.

Your safety and comfort may depend on us.

PEAK ENGINEERING CO. LTD.

THEM MOVING

These illustrations represent some of the projects in which Peak precision engineering has been incorporated.



British Railways Corridor Ist Class Coach Type 'A' by permission of Metropolitan-Cammell Carriage & Wagon Co. Ltd.

Sailing Craft fitted with twin Perkins 35 h.p. Outboard Motor.
Inset-six 354 vehicle diesel engine, by permission of Perkins Group of Companies.

ger Coach by
A.E.C. Ltd.

rdson Tractor, by permission of Ford Motor Co. Ltd.

Precision made parts by us are used in a vast variety of engineering applications in the air, on the land, on the sea and even in your kitchen. Your washing machine probably has one. If you are lucky enough to own a dishwasher, there is probably one in that too.

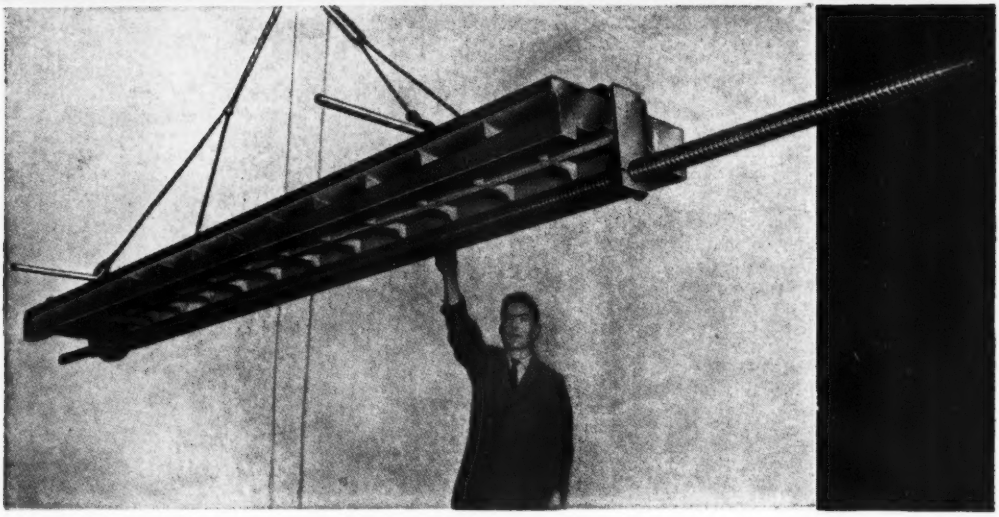
PRECISION AND PRODUCTION ENGINEERS

MASONS ROAD, STRATFORD — UPON — AVON, WARWICKSHIRE.

Telephone: Stratford-upon-Avon 3821. Telex 31627

LUBRICATION & WEAR PROBLEMS SOLVED BY ROTAX

WITH THE MOST ADVANCED RECIRCULATING BALL THREADS USED IN INDUSTRY



Rotax Precision Ballscrew assemblies are available to manufacturers, in all types of industry, for all types of application. Precision Ballscrews improve machine tool efficiency and drastically reduce maintenance costs.
The 25′ hardened precision ballscrew illustrated is being fitted to a high speed plane miller at Brooke Tool Automation Limited.

ROTAX

INDUSTRIAL GROUP ROTAX LIMITED
WILLESDEN JUNCTION, LONDON N.W.10

LUCAS-ROTAX (AUSTRALIA) PTY., LTD., Melbourne and Sydney, Australia
LUCAS-ROTAX LTD., Toronto, Montreal and Vancouver, Canada

WIN half the battle BEFORE you start!

PL

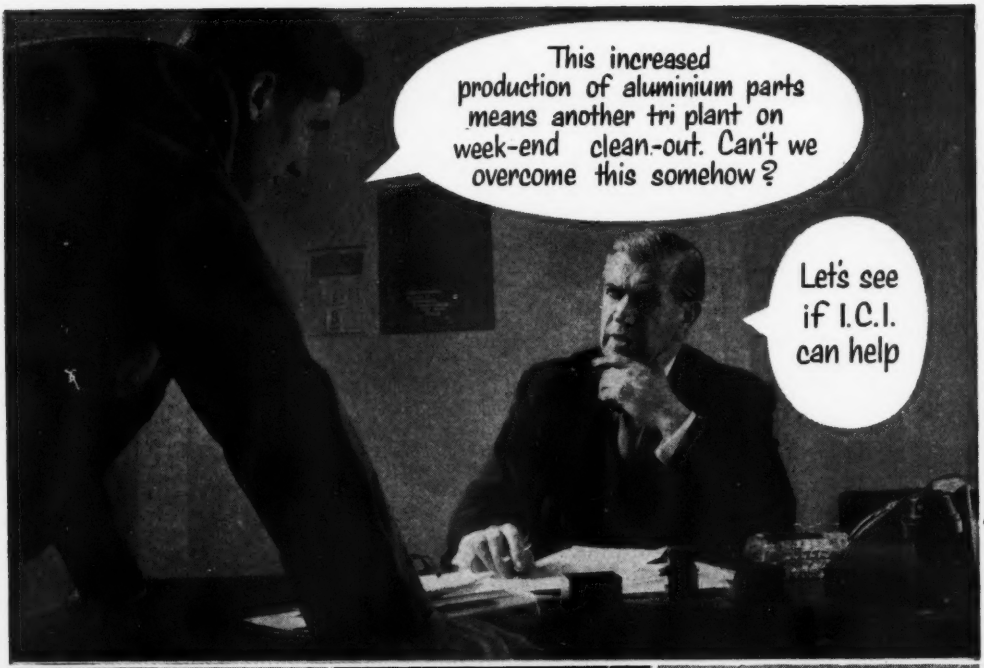
SIZES FROM $\frac{1}{16}$in. TO 1$\frac{3}{4}$in. DIAMETER SUPPLIED TO LIMITS OF ±0·00025in. SIZES ABOVE 1$\frac{3}{4}$in. TO 3in. DIAMETER SUPPLIED TO LIMITS OF ±0·0005in. LENGTHS FROM 6ft. TO 30ft. ALL WITH FLAWLESS SURFACE FINISH.

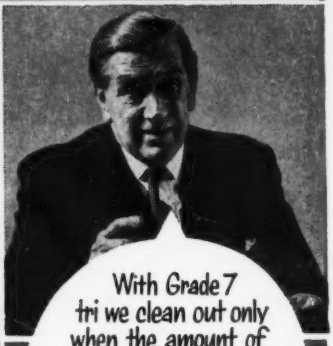
PRATT, LEVICK & CO. LTD.

CHESTER · ENGLAND

TELEPHONE: CHESTER 22265/6

When answering advertisements kindly mention MACHINERY.


This increased production of aluminium parts means another tri plant on week-end clean-out. Can't we overcome this somehow?
Let's see if I.C.I. can help



I.C.I.'s rep. told us about a new I.C.I. solvent—Grade 7 trichloroethylene—that gives excellent protection against aluminium reaction.

We decided to tackle our problem by putting all plants dealing with aluminium on Grade 7 tri-which would mean less frequent clean-outs.

With Grade 7 tri we clean out only when the amount of aluminium swarf makes it necessary – which gives weeks of continuous running. Ask I.C.I. for Grade 7 trichloroethylene if you are worried about degreasing aluminium.

ICI GENERAL CHEMICALS DIVISION

It pays to consult I.C.I. Metal Degreasing Service

IMPERIAL CHEMICAL INDUSTRIES LIMITED LONDON SW1

DP.267

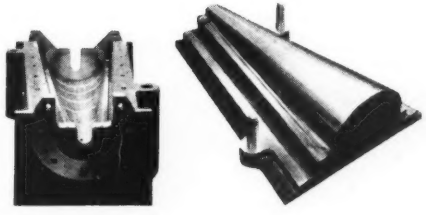
Save on time and cost of cold and hot forming operations by using HARPER 'CAST-TO-FORM' TOOLS

If you are forming metals, plastics, rubber, glass fibre or asbestos compounds you can save time and money. Harper 'cast-to-form' tools need minimum finishing before putting into service and first quality materials ensure long life. We can offer exceptionally good delivery.

Fully descriptive technical leaflet T.3 on request from:

JOHN HARPER & CO. LTD., WILLENHALL, STAFFS.

WILLENHALL 124 (5 lines) · FOUNDED 1790 · LONDON: ABBey 5906/7
MANCHESTER: BLAckfriars 0295 · POOLE FOUNDRY LTD: POOLE 212
Makers of the famous Beatrice Oil Heaters and Harper Housewares



Showing the high finish obtainable on polished tools used for production of six-feet long asbestos components.

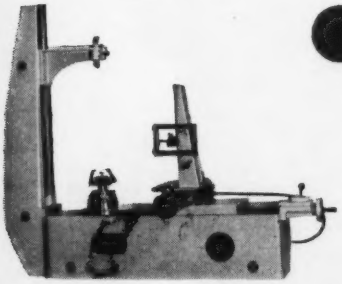
let us "HANDLE" your machines

WM. WHITELEY & SONS, LTD. *incorporating* J. CHARLESWORTH
(MACHINE TOOL DIVISION) PROSPECT IRONWORKS, LOCKWOOD, HUDDERSFIELD, YORK
Telegrams: Drying, Huddersfield Telephone: Huddersfield 4410
makers of Machine Components since 1854

Goulder

GEAR MEASURING EQUIPMENT

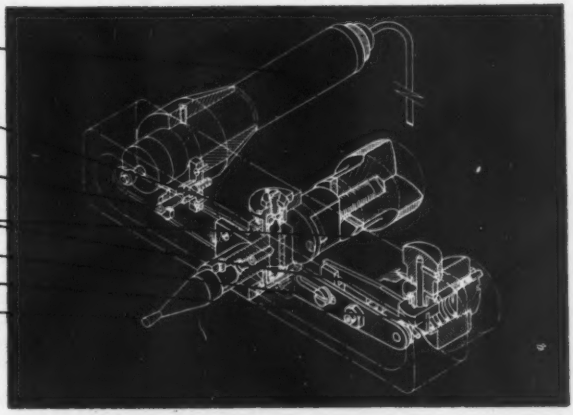
This series of advertisements is intended to show how attention to detail design backed by careful and precise manufacture has made Goulder gear measuring equipment first choice of buyers who appreciate these qualities.



INVOLUTE TESTER INDICATING HEAD

used on Goulder Nos. 1, 2 and 3 Involute Testers to measure deviation of profile from true involute.

- ELECTRONIC RECORDING USING AXIAL GAUGE HEAD WHICH CAN BE USED ON OTHER INSTRUMENTS WHEN REQUIRED
- PIVOT BEARINGS FOR SENSITIVITY AND ACCURACY
- PROTECTION AND EASE OF OPERATION THROUGH TRAVEL LIMITING DEVICE
- BUILT IN BIASSING THROUGH LEAF SPRING
- SIMPLE MEASURING PRESSURE ADJUSTMENT
- ADJUSTABLE BALANCE SPRING
- INTERCHANGEABLE STYLUS
- UNIT CONSTRUCTION FOR EASE OF MAINTENANCE
- ROBUST AND DUSTPROOF ASSEMBLY



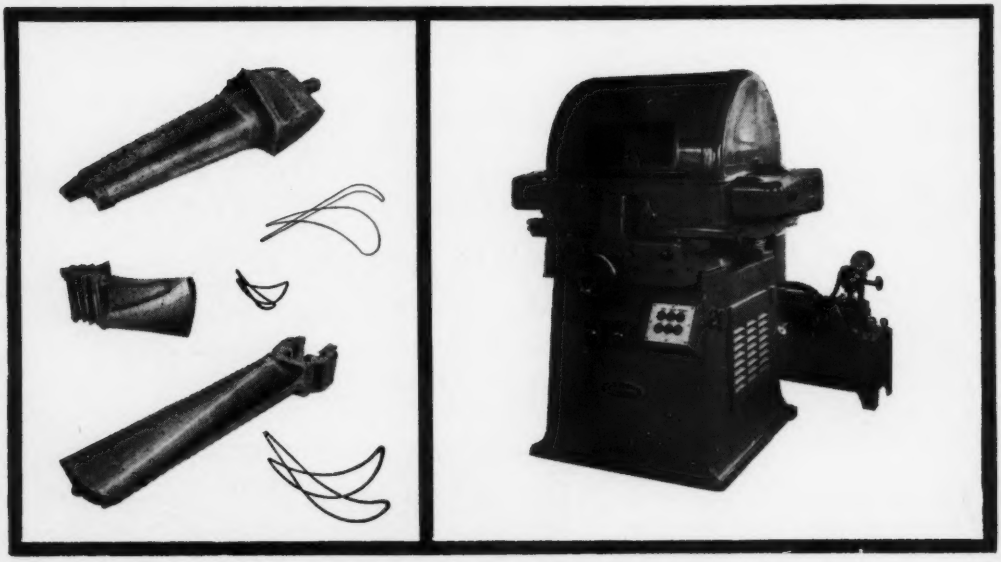
Goulder *THE NAME FOR ALL GEAR TESTING*

J. Goulder & Sons Ltd., KIRKHEATON, HUDDERSFIELD. *Tel: Huddersfield 5252-3*

M.15

Cadamco

The only precision copy belt grinding machine in the world to reproduce any shape of turbine blade



- Automatic machine cycle—one operator can control a bank of machines
- Accurate to ± ·002 in.
- Currently operating throughout the British turbine industry

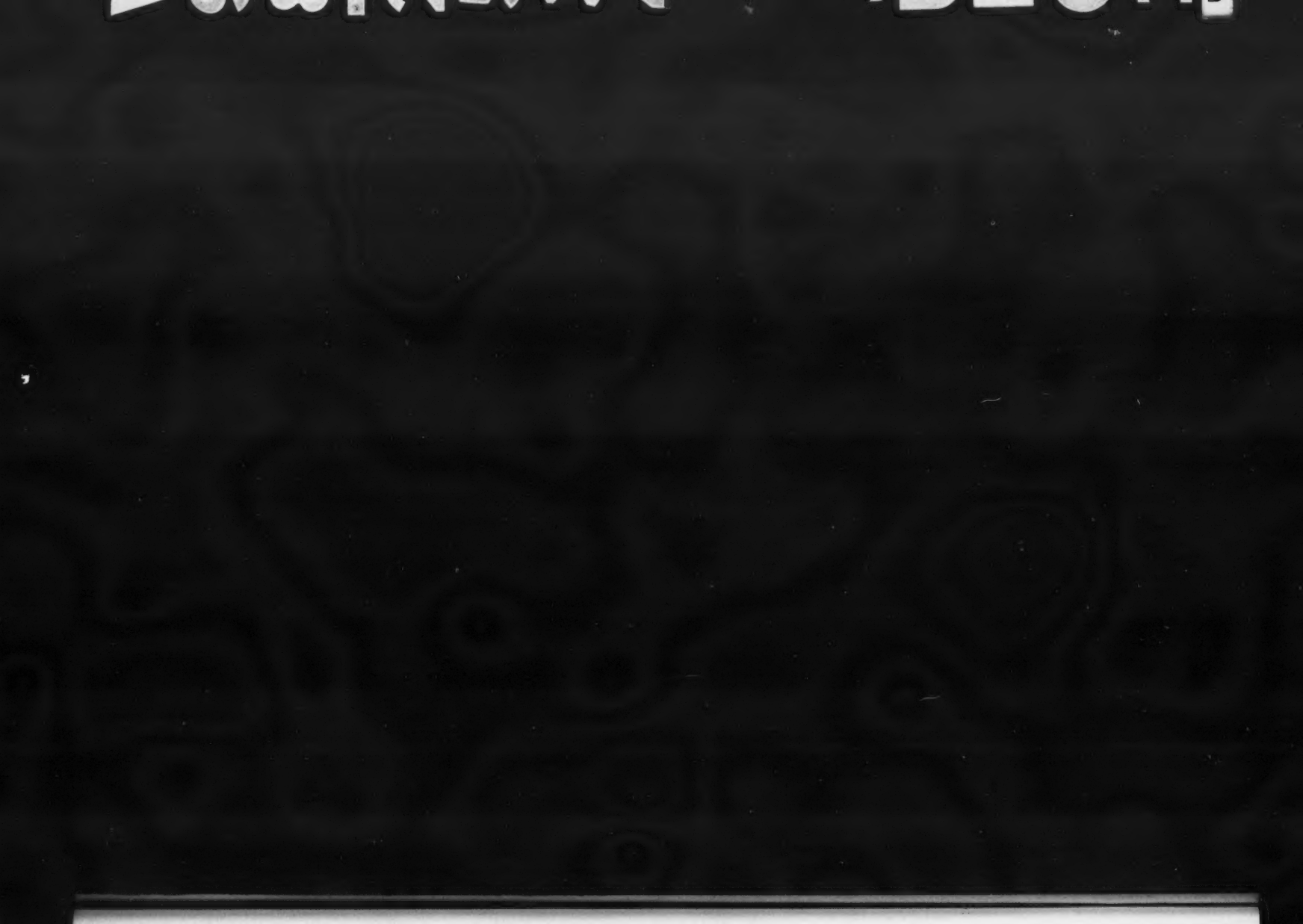
CYRIL ADAMS & CO. LTD.,

155 East Barnet Road, New Barnet, Hertfordshire
Telephone: Barnet 2335/6/7

Designers and Manufacturers of Jigs, Fixtures and Special Purpose Machine Tools

Member of the Staveley Coal & Iron Co. Limited Group of Companies, in association with James Archdale and George Richards

Member of the Machine Tool Trades Association



spli

This m
machin
well-kn
of ligh
recipro
a sequ

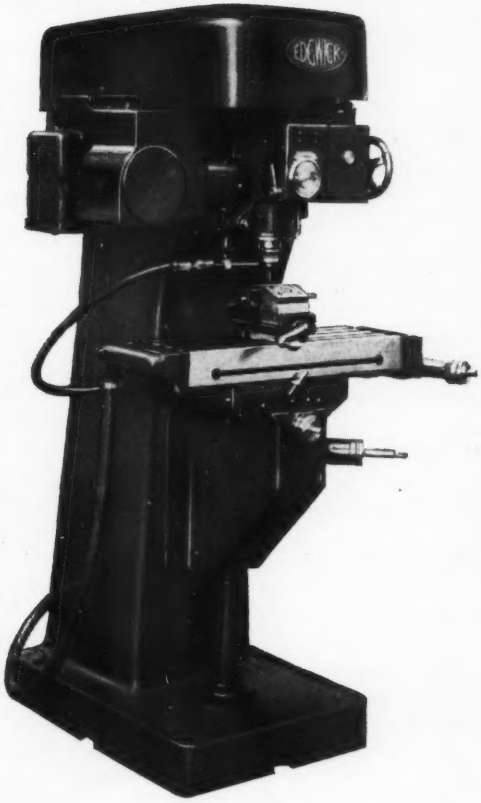
On ge
machi
as a li
milling

Max. l
table
setting

Max. c

—— for fast, accurate machining of keyways, slots, splines, etc., the ——

EDGWICK KEYSEATER



This machine is designed to machine a keyseat by the well-known principle of a series of light cuts with a reciprocating cutter slide and a sequence down-feed.

On general toolroom work the machine can be used to advantage as a light hand-feed vertical milling machine.

Max. keyway cut, auto crank drive and table adjustment, $\frac{1}{2}$" x 20". (at one setting of the table $\frac{3}{4}$" x 5").

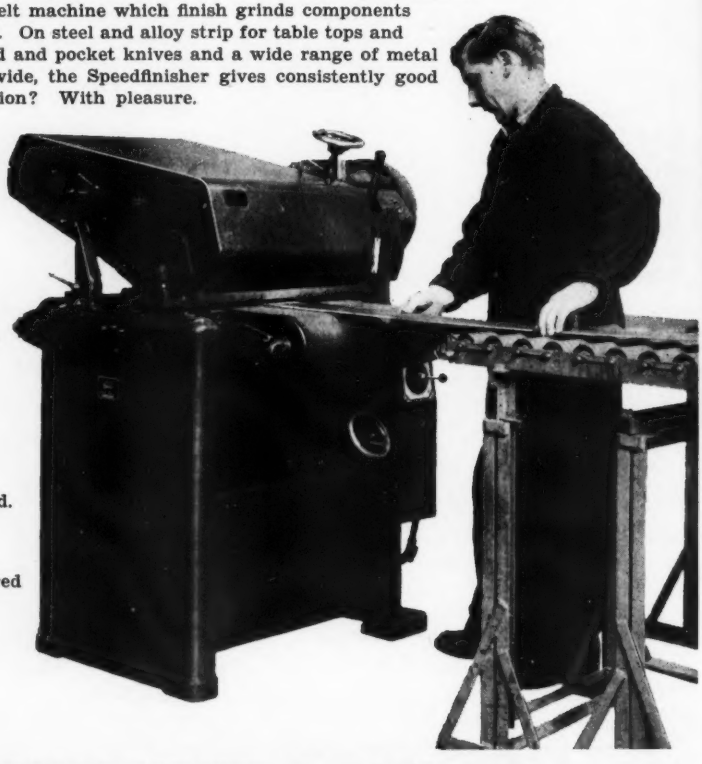
Max. depth of keyway cut, automatic, $2\frac{1}{4}$".

ALFRED HERBERT LTD., COVENTRY Factored Division, Red Lane Works.

AD.546

a GOOD START for a GOOD FINISH

There's a very good case for paying particular attention to the finish of a product—before you commence production. And you can pay no more particular attention than by installing a White Junior model T.O.P. Speedfinisher. Here's an abrasive belt machine which finish grinds components at a prodigious speed. On steel and alloy strip for table tops and shop fittings, on hand and pocket knives and a wide range of metal products up to 18" wide, the Speedfinisher gives consistently good results. Demonstration? With pleasure.



★ Floorspace only 26" x 35"

★ Variable speeds—20 - 54 f/m.

★ Automatic belt tracking rolls.

★ Abrasive belt length 72"

★ Belt replaced in 2 mins.

★ Exhaust hood/guard combined.

★ Improved stock removal by spirally-serrated, rubber-covered abrasive contact roll.

White

THOMAS WHITE & SONS LTD.

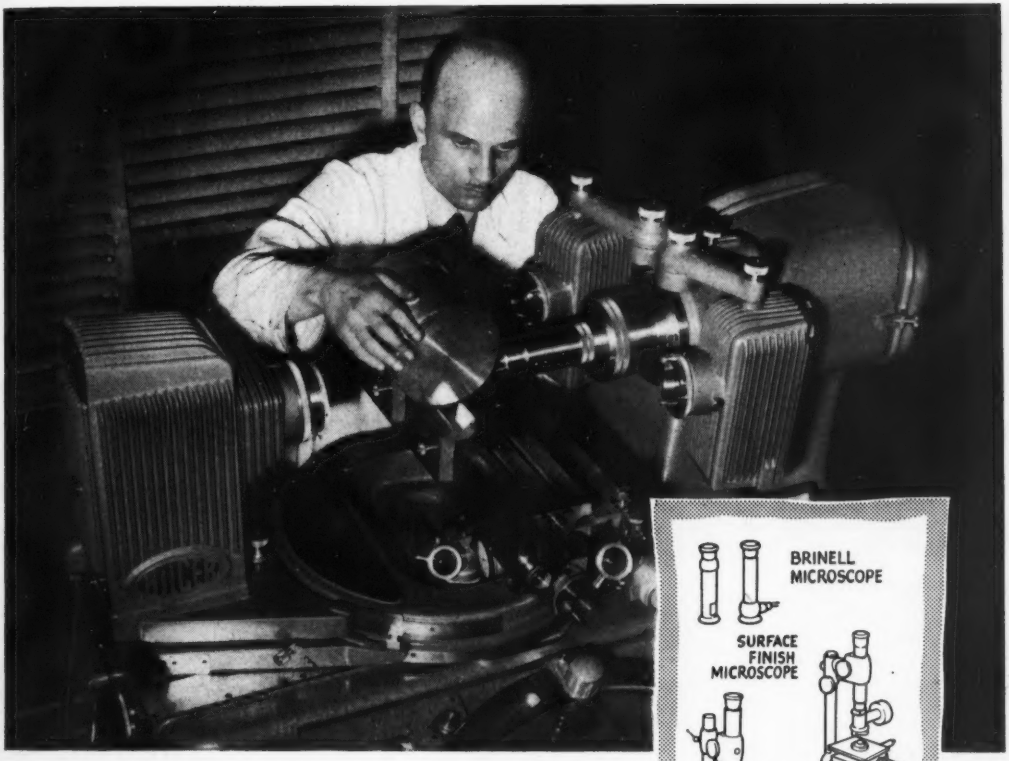
LAIGHPARK, PAISLEY, SCOTLAND. Tel: Paisley 3137

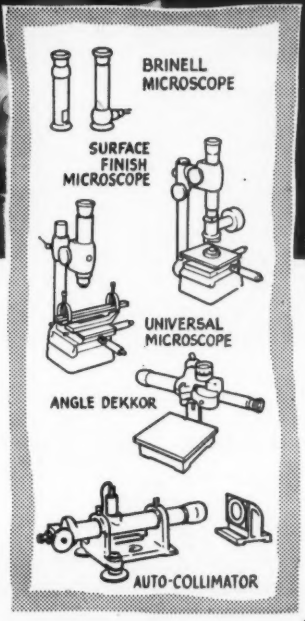
LONDON OFFICE: CLIFTON HOUSE, EUSTON ROAD, N.W.1. Tel: Euston 4196/7

74

HILGER & WATTS

precision measuring instruments





Wide range fulfilling specific requirements in Toolrooms, Machine Shops, and Research Establishments. Apart from those instruments illustrated the range includes:—

Projectors—Universal, Enlarger and Production types.
Interferometers.
Microptic Measuring Machines, Vertical and Horizontal types.
Alignment Telescopes.
Machine Tool Scales and Projectors.
Bore Profilograph.
Levels, Clinometers, Protractors and Microscopes of various types.

Consultant service covering the whole field of metrology offered by:—

ALFRED HERBERT LTD. COVENTRY

AD 647

Your metal requirements
CAN BE SATISFIED BY
NETTLEFOLD & MOSER
WIDE RANGE
WITH A SPEEDY DELIVERY SERVICE
Our Stock range covers:
'Mills' Bright Steel: rounds, squares, hexagons, angles, flats.
'Mills' Ledloy Bright Freecutting to Spec. EN.I.A:
rounds, squares, hexagons:
'Mills' Bright Super Non-Leaded Freecutting to Spec. EN.I.A:
rounds, hexagons.
'Mills' Bright Steel to EN Specifications.
Aluminium Sheets.
Brass Bars & Flats.
Black Mild Steel: rounds, squares, flats, angles, channels, tees.
Steel Plates.
Sheets: Black: Cold Reduced General Purpose and Oiled, Hot Rolled Strip Mill, C.R.C.A.P.F.
Galvanised: "Galvatite", "Speltafast", C.R.C.A.P.F., Corrugated.
Nettlefold & Moser Limited are main stockholding agents for Exors of James Mills Limited (Bright Steels) and United Non-Ferrous Metals Co. Limited (Brass Bars & Flats).

You save time by ringing Nettlefold & Moser

STEEL STOCKHOLDER SERVICE

the metal stockholders—FIRST

NETTLEFOLD & MOSER LIMITED **LONDON** (Head Office)
170-194 Borough High Street, S.E.1. Tel: HOP 7111 (40 lines) **BOOTLE**—Dunnings Bridge Road, Bootle 10, Lancs. Tel: AINTREE 4171 (6 lines) **HULL**—201 Sculcoates Lane. Tel: HULL 41341 (3 lines)
NM49

the ultimate in **JIG GRINDING**

MOORE-CATMUR
No. 2 PRECISION JIG GRINDER

The craftsman's choice —for high precision and rapid stock removal.

The dust protective aprons have been removed for the actual photograph.

CATMUR MACHINE TOOL CORPORATION LIMITED

103 Lancaster Road, Ladbroke Grove, London, W.11. 'Phone PARk 9451/2

NRP 2631

Leytool RATCHET SPANNERS

10 STANDARD SIZES

TO FIT **500** NUT SIZES

Leytool Ratchet Spanners are essential to speed and ease of installation and servicing work. They are precision made in 10 standard sizes to fit 500 nut and bolt sizes, and are available in B.A., Whitworth and B.S.F. Standard Hexagon and American A/F., Squares and Metric Hexagons.

Whatever the purpose, wherever the nut, a Leytool Ratchet Spanner will reach and hold it without damage. Made of carbon chrome steel, hardened and negradised, they are the strongest and indeed the finest Ratchet Spanners made.

Also available are Leytool large size and Reversible Ratchet Spanners, Socket Sets and single Sockets with driver in any size.

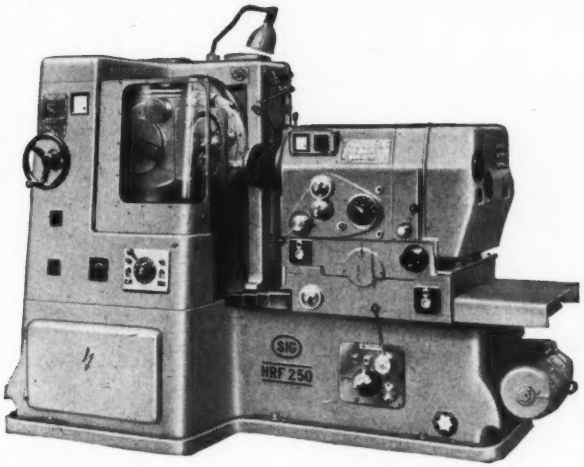
Write for Catalogue describing the complete range of Leytool Ratchet Spanners and Hand Tools.

Leytonstone JIG & TOOL CO. LTD.

LEYTOOL WORKS, HIGH ROAD, LEYTON, LONDON E.10

Telephone LEYtonstone 5022-3-4

For *Rapid* Accurate Cam Milling...



SWISS S.I.G.

HYDRAULIC CAM MILLER MODEL HRF 250

All types of cams—plate cams, track cams, face, cylindrical and special cams, irregular forms—and tracks up to 8 convolutions—can be copied accurately and economically from simple sheet steel masters. Hydraulic longitudinal feeds and rapid traverse. Face plate speeds steplessly variable ·016 to 2 r.p.m. 13 milling spindle speeds 100 to 1600 r.p.m. or alternatively stepless speeds 100 to 2000 r.p.m. A hydraulic device for roller offset compensation is available and, for hardened cams, grinding attachments giving wheel speeds up to 15,000 or alternatively up to 24,000 r.p.m.

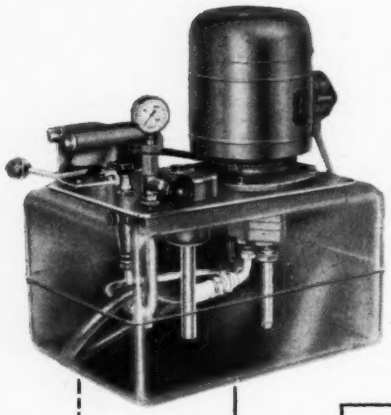
Maximum diameter: plate cams 12", cylindrical cams 14".
Maximum height cylindrical cams 10".

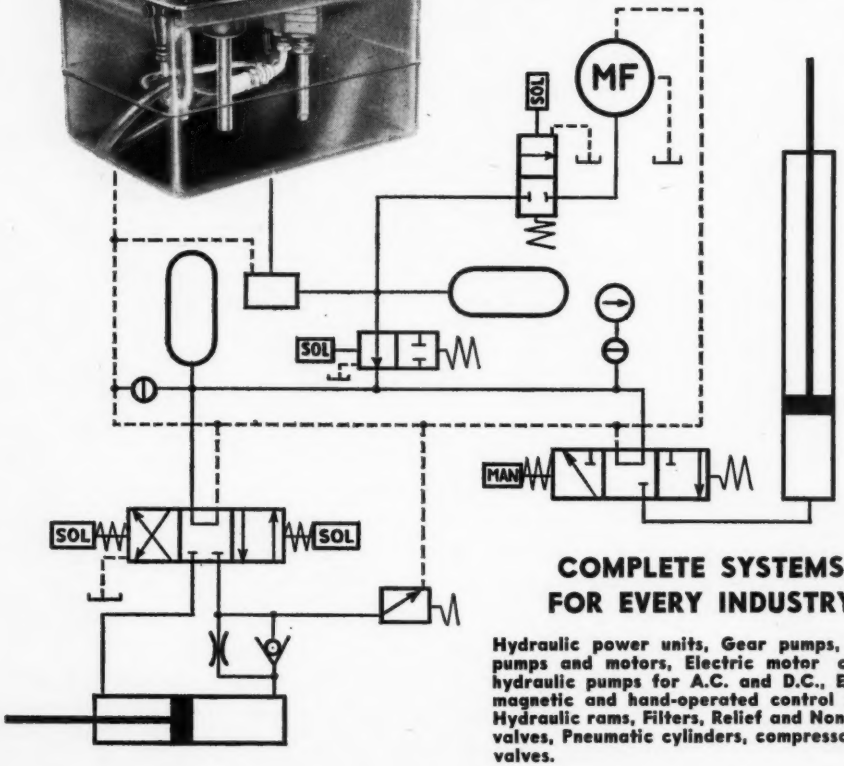
Send for brochure M/210 from the Sole U.K. Distributors

DOWDING & DOLL LTD
346 KENSINGTON HIGH STREET, LONDON, W.14
Tel: WESTERN 8077 (8 lines) *Telex:* 23182 *Grams:* ACCURATOOL LONDON TELEX

210

BOSCH
Hydraulic
and
Pneumatic
Equipment





COMPLETE SYSTEMS FOR EVERY INDUSTRY

Hydraulic power units, Gear pumps, Piston pumps and motors, Electric motor coupled hydraulic pumps for A.C. and D.C., Electro-magnetic and hand-operated control valves, Hydraulic rams, Filters, Relief and Non-return valves, Pneumatic cylinders, compressors and valves.

Our industrial division will forward complete details to Engineers

BOSCH LIMITED

CARLISLE ROAD, HENDON, LONDON, N.W.9 Teleg: ELECBRIGHT, PHONE, LONDON Tel: COLINDALE 0161

ANNUAL REPORT

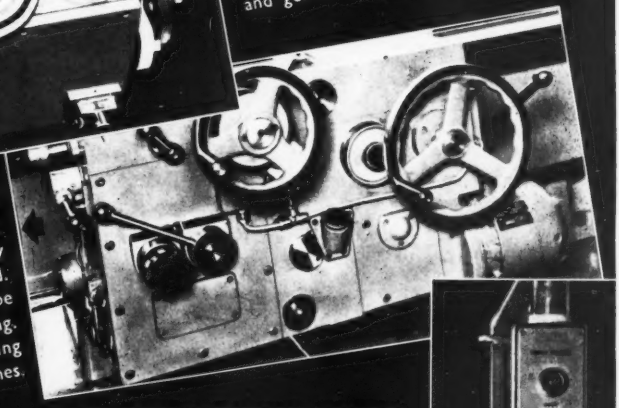
mo
JOH
JOHN
Telepho

model A4 SLIDING SURFACING & SCREWCUTTING LATHES

24" TO 50" SWING

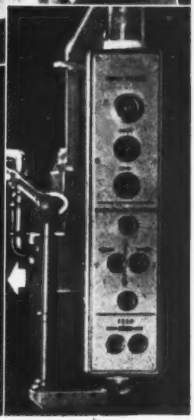
GEAR BOX

36 Feeds and threads selected at direct reading dial.
Single lever operation.
Inch pitches, metric, module and D.P. also available.
Totally enclosed with all bearings and gears pump lubricated.



APRON

Totally enclosed with all gears and bearings pump lubricated.
Leadscrew nut automatically lubricated when closed.
Feed change allows feeds to be halved or doubled while cutting.
Feed engaged by push button operating magnetic clutches.



PUSH BUTTON PENDANT CONTROL

Set at the most convenient position for the operator and contains:
Feed, "on" — "off."
Four directional quick power traverse.
Main motor, "start" — "stop."
Warning lights.

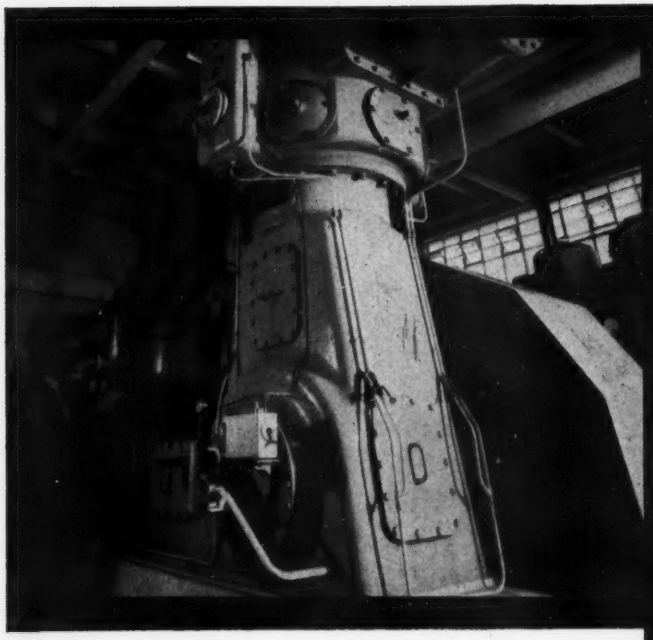
NEW FROM LANG

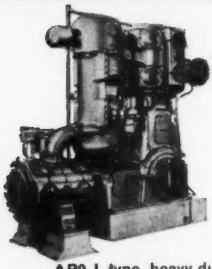
JOHN LANG & SONS LTD.
JOHNSTONE RENFREWSHIRE SCOTLAND
Telephone: Johnstone 400 Telegrams: "Lang Johnstone"

LONDON OFFICE
ASSOCIATED BRITISH MACHINE TOOL MAKERS LIMITED
17 GROSVENOR GARDENS SW1

L227M

THE VITAL STATISTICS OF AIR POWER





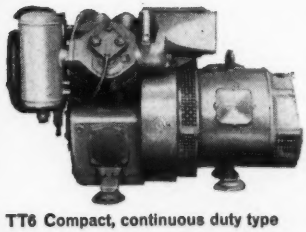
AR9 L type, heavy duty

ER6 Heavy duty type

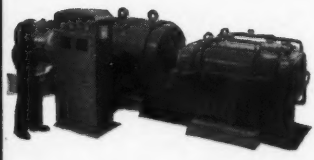
Atlas Copco make stationary compressors for every purpose. Whatever the needs of industry, the extensive Atlas Copco range — reciprocating machines from 2·5 to 3,200 c.f.m. and Twin Air rotaries up to 20,000 c.f.m., ensure specialised equipment to meet specialised demand.

Whether industry is concerned with electrical power economies, the high cost of water for water-cooled units or that ever present problem, space shortage, Atlas Copco can help you in the provision of a suitable compressor to overcome your particular problem.

Atlas Copco are pleased to offer specialised advice and consultation on your installation, and leaflets describing the range of Atlas Copco stationary compressors are readily available on request. Write, giving some indication of the type of machine you are interested in, to your local Atlas Copco branch or to the Head Office.



TT6 Compact, continuous duty type



TWIN AIR Rotary Screw

Atlas Copco compressed air engineers

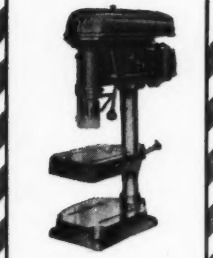
ATLAS COPCO (GREAT BRITAIN) LIMITED
Maylands Avenue, Hemel Hempstead, Herts. Telephone: Boxmoor 6040
Sales and service depots at: LONDON: BRISTOL: CARDIFF: LICHFIELD: LEEDS: MANCHESTER: NEWCASTLE: GLASGOW: BELFAST: DUBLIN.

S/20ER

When answering advertisements kindly mention MACHINERY.

MEDDINGS Pacera

For drilling machines plus complete tooling service



DRILTRU
½″ Capacity
from £42

LB. 1 MK II
½″ Capacity
from £56.15.0

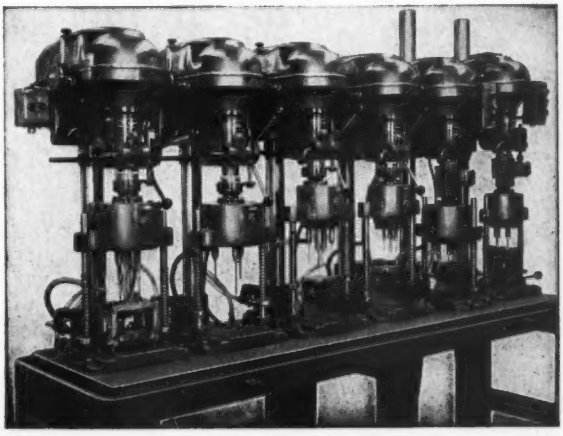
MB. 2 MK II
⅝″ Capacity
from £66

MB. 4
⅞″ Capacity
from £91.10.0

Four very popular models are illustrated. We also make a full range of pedestal, multi-head, wall mounting and articulating head machines with throat depths up to 24″.

A COMPLETELY TOOLED SET-UP FOR *YOUR* PRODUCTION LINE

Have you investigated the possibility of using time-saving multi-spindle or multi-head methods on your components? We can supply anything from a simple 2-spindle attachment to a complete drill, ream, counterbore and tap sequence. Jigs and fixtures too, of course.



Write for full details to the Makers:

W. J. MEDDINGS, LTD.

IPSWICH ROAD, TRADING ESTATE, SLOUGH, BUCKS.

Tel: Slough 26761

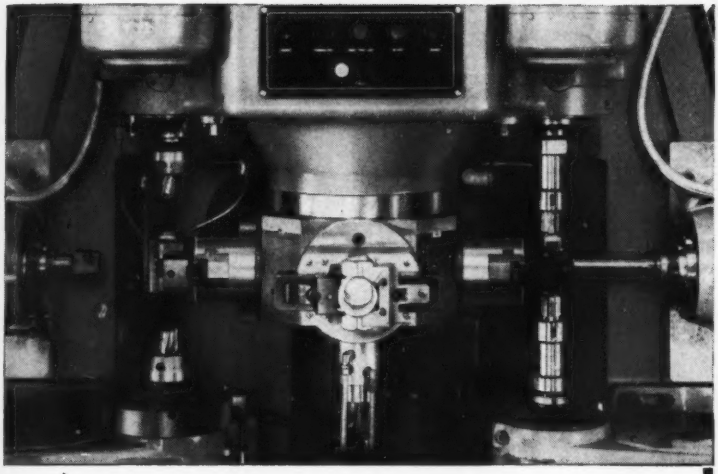
Beard and Fitch Ltd

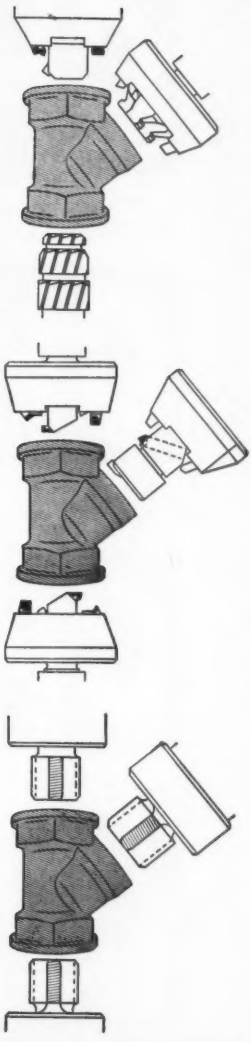
have been makers of the finest quality

in Clerkenwell, London since 1851

In order to meet the increasing demand a new factory has now been prepared in Harlow, where full production is in progress

EDINBURGH WAY
HARLOW
Harlow 25358





Diedesheim fully Automatic multi-unit machine

for the production of pipe fittings, valve and cock bodies

and similar components

MODEL AMI WITH 9 UNITS

MODEL AMII WITH 12 UNITS

- Suitable for drilling — boring — facing — threading — sawing — milling — multi-spindle drilling & tapping, etc.
- Simultaneous machining — from three directions — at each station.
- Capacity for $\frac{3}{8}$″ to 2″ nominal size pipe fittings
- Spindle speeds to suit all materials
- Infinitely variable feed to each unit
- Foolproof reloading during cutting cycle
- Hydraulic chucking with auto-release
- Rapid change-over to different components
- Three or four working stations

Production times for lateral valve housing illustrated:
$\frac{1}{2}$″ nom. size: 7 secs. 1″ nom. size: 10 secs. 2″ nom. size: 18 secs.

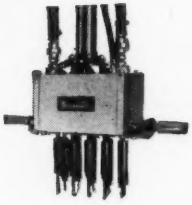
Sole British Agents

SYKES

Machine Tool Co. Ltd

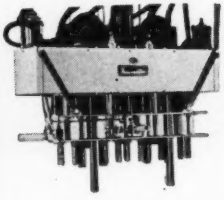
Hythe Works, The Hythe
Staines, Middlesex
Telephone
Staines 55474 (5 lines)
Telegrams Sytool Staines

CHOUF!



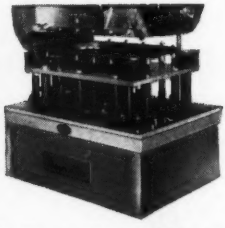
A Desoutter multi-studrunner plants 9 studs into an Austin cylinder block.

CHOUF!



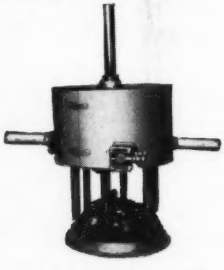
A Desoutter multi-nutrunner fixes 25 nuts on a Ford diesel cylinder head.

CHOUF!



A Triumph Herald sump is put on by a Desoutter 16-spindle multi-nutrunner.

CHOUF!



A Desoutter multi-nutrunner assembles a Vauxhall clutch plate, or tightens the wheel nuts on a Rootes Group car. And so it goes on: the Desoutter CHOUF speeds mass-production, makes sweet music in industrialists' ears. And no wonder—everyone has a taste for that sort of music—and nearly everyone has something to play it on! CHOUF! (on a carburettor)...CHOUF! (or a light fitting)... CHOUF! (or a washing machine)... CHOUF! (or anything else that needs assembling).

DESOUTTER MULTI-NUTRUNNERS · SCREWDRIVERS AND STUDRUNNERS

DESOUTTER BROTHERS LIMITED · THE HYDE · HENDON N.W.9

cac/DT/345

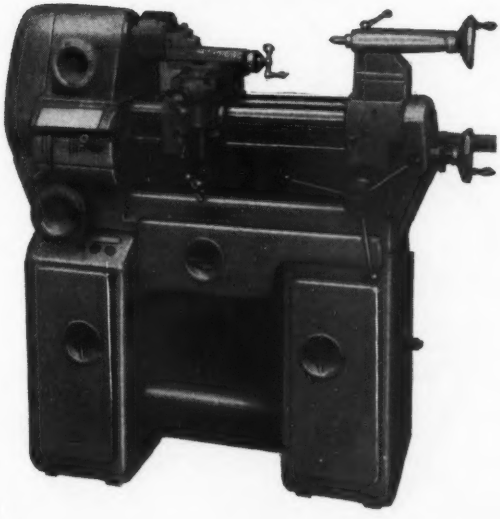
When answering advertisements kindly mention MACHINERY.

Kneller Multi-Purpose Lathes in the Development Department of Hymatic Engineering Co. Ltd., Redditch

KNELLER

MULTI-PURPOSE LATHES

Although termed lathe, this versatile machine has additional characteristics such as the tailstock unit can be traversed by hand or mechanically with a range of feeds. A vertical movement to the saddle table providing characteristics of a horizontal boring machine, with thread cutting facilities. A facing slide is supplied to perform this operation. This machine is an essential for toolrooms and research departments, where pre-production and small quantities of accurate and intricate machining are required. Also being used in Technical Colleges for educational purposes.



KNELLER (Instruments & Tools) LTD., LONDON ROAD, DAVENTRY Tel: DAVENTRY 446

Unbeatable

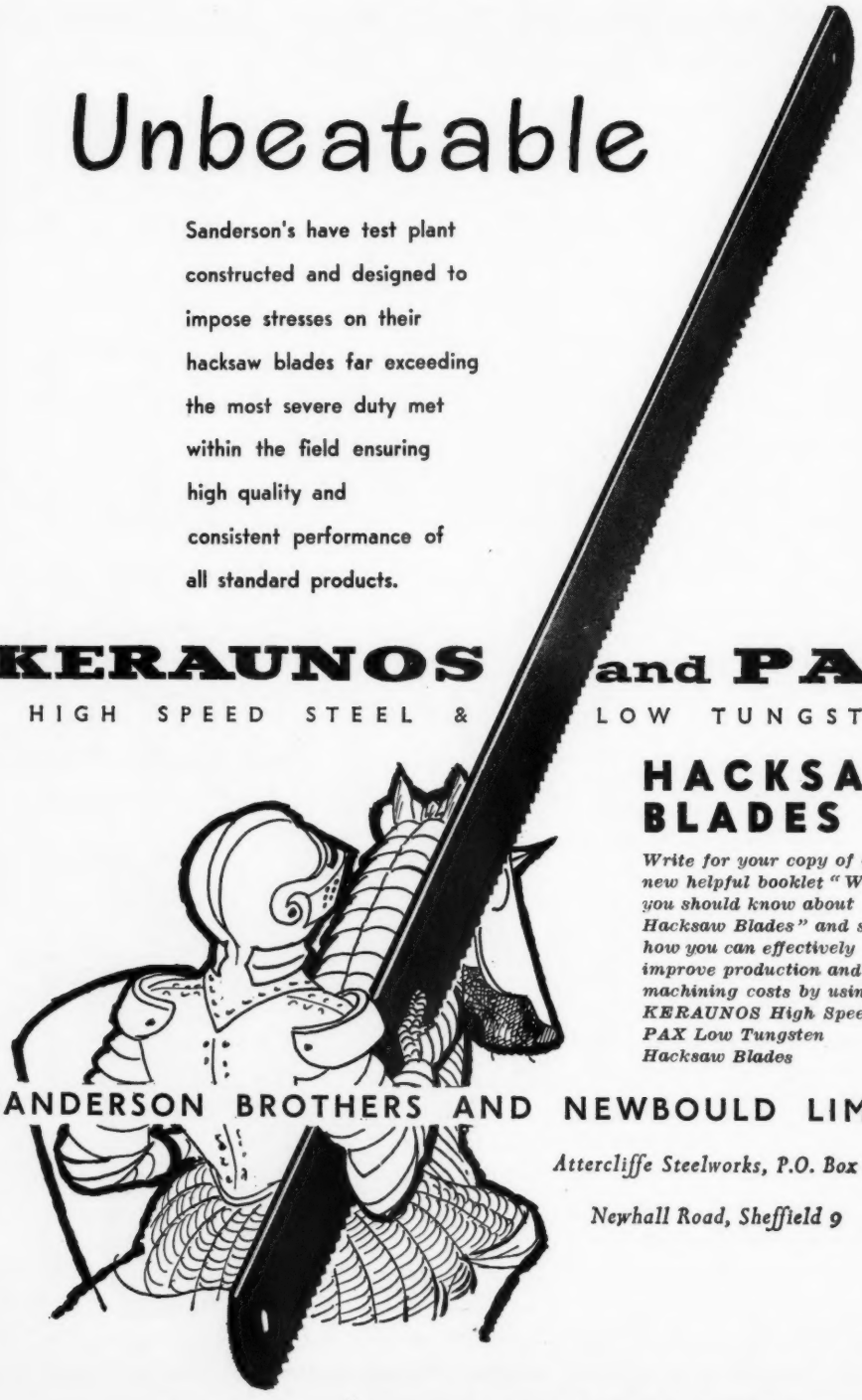
Sanderson's have test plant constructed and designed to impose stresses on their hacksaw blades far exceeding the most severe duty met within the field ensuring high quality and consistent performance of all standard products.

KERAUNOS and PAX

HIGH SPEED STEEL & LOW TUNGSTEN

HACKSAW BLADES

Write for your copy of our new helpful booklet "What you should know about Hacksaw Blades" and see how you can effectively improve production and reduce machining costs by using KERAUNOS High Speed and PAX Low Tungsten Hacksaw Blades



SANDERSON BROTHERS AND NEWBOULD LIMITED

Attercliffe Steelworks, P.O. Box 6,

Newhall Road, Sheffield 9

961

K

D

- Gea
soli
com
tion
- Gea
can
and
- Ger
ates
- Gea
fron
forn
peri
heli
- Any
pitc
alte
the
- Buil
sem
bein
fitte
- For
grin
dres
ly in

Stud

ALSO A

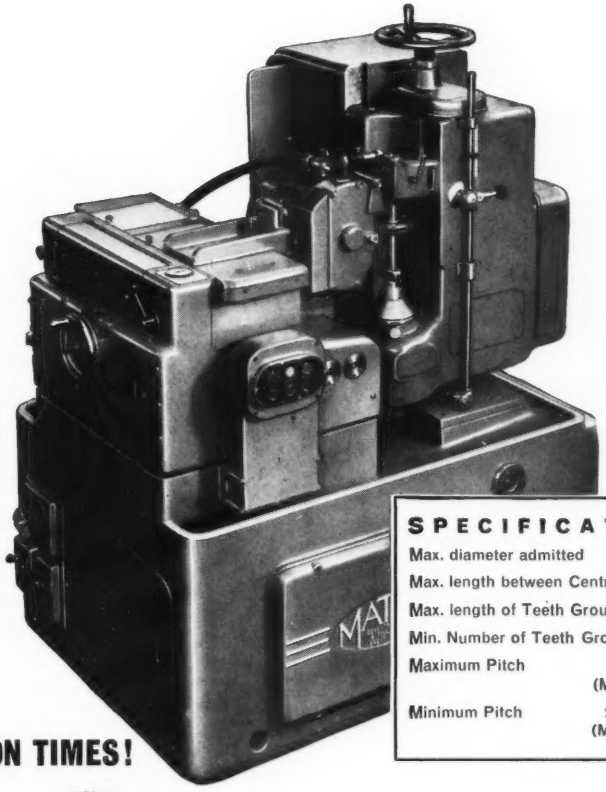
MATRI

MATRIX QUALITY

GRIND
YOUR SMALL SPUR GEARS
better and faster than by cutting

GEAR GRINDING MACHINE
NO. 61-6-9

- Gears can be ground from solid hardened blanks overcoming heat treatment distortion problems.
- Gears of suitable dimensions can be mounted in multiples and ground in one operation.
- Generating principle eliminates indexing.
- Gear tooth development is from the basic rack which is formed on the grinding wheel periphery in a continuous helix.
- Any diameter gears of similar pitch can be ground merely by altering the change gears for the number of teeth.
- Built-in wheel crushing unit is semi-automatic, type of pitch being governed by three easily fitted racks and segments.
- For gears of extreme precision, grinding wheel is diamond dressed by unit which is quickly interchanged with crusher.



SPECIFICATION

Max. diameter admitted	6″
Max. length between Centres	9″
Max. length of Teeth Ground	3″
Min. Number of Teeth Ground	12
Maximum Pitch	16 D.P. (Module 1.6)
Minimum Pitch	200 D.P. (Module·125)

Study these PRODUCTION TIMES!

4½ mins.
40 D.P. 120 Teeth.
3″ P.C.D.

12 secs. each
15 gears ground simultaneously
1.20 Module 40 Teeth.
48 mm. P.C.D.

2½ mins.
48 D.P.
24 Teeth.
0.5″ P.C.D.

ROCKWELL MACHINE TOOL CO. LTD.

For further particulars write or telephone TODAY

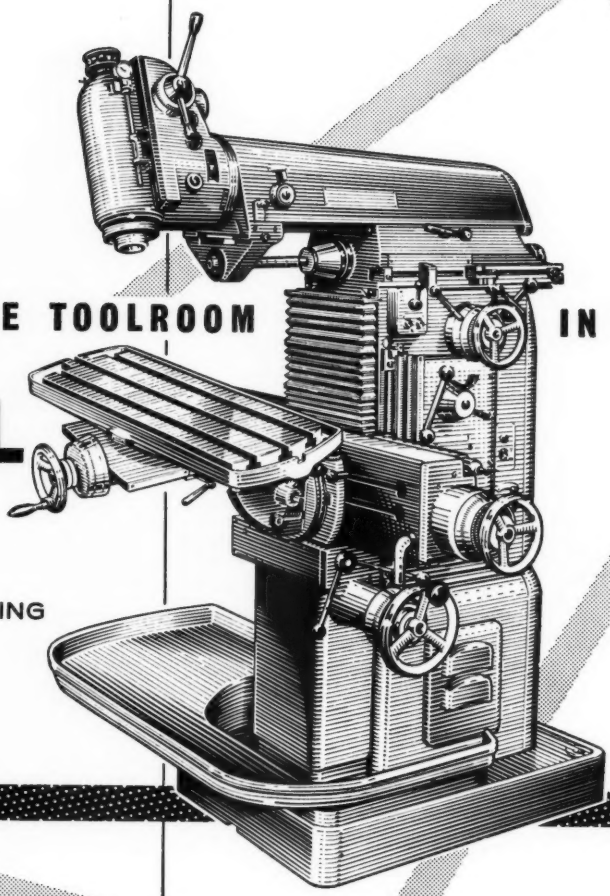
WELSH HARP, EDGWARE RD., LONDON, N.W.2. TEL: GLADSTONE 0033

ALSO AT BIRMINGHAM—TEL: SPRINGFIELD 1134/5 · STOCKPORT—TEL: STOCKPORT 5241 · GLASGOW—TEL: MERRYLEE 2822

A COMPLETE TOOLROOM IN ITSELF

THIEL 158

DUPLEX
TOOLROOM MILLING
MACHINE



This well established machine, designed for sustained accuracy, extreme versatility, simple operation and long life, is one of the Thiel range of precision toolroom machines.

Ask for 16 page catalogue

ROCKWELL MACHINE TOOL CO. LTD.
WELSH HARP, EDGWARE RD., LONDON, N.W.2. TEL: GLADSTONE 0033

ALSO AT BIRMINGHAM—TEL: SPRINGFIELD 1134/5 • STOCKPORT—TEL: STOCKPORT 5241 • GLASGOW—TEL: MERRYLEE 2822

THIEL 9

Intricate FORMED STAMPINGS...

-IN ONE OPERATION!

British-built MACHINES

One "U.S." Multi-Slide Machine has replaced as many as eight separate press operations on the production of a complex part. Two models are available which can be supplied completely tooled for the production of one or more components. If you manufacture formed stampings from material up to 3″ wide the "U.S." Multi-Slide Machine offers outstanding reductions in production costs. Substantial material savings, less parts handling, less floor space, are only some of the benefits.

Send us samples or drawings of the stampings you are producing or considering and we will be pleased to submit a detailed quotation.

ROCKWELL
MACHINE TOOL CO. LTD.

For further particulars write or telephone TODAY

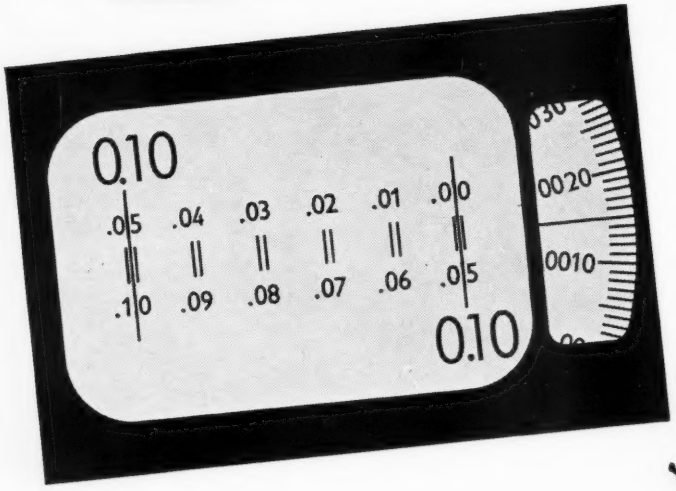
WELSH HARP, EDGWARE RD., LONDON, N.W.2. TEL: GLADSTONE 0033

ALSO AT BIRMINGHAM—TEL: SPRINGFIELD 1134/5 • STOCKPORT—TEL: STOCKPORT 5241 • GLASGOW—TEL: MERRYLEE 2822

US 7A

The aba Precision Jig Boring Machine

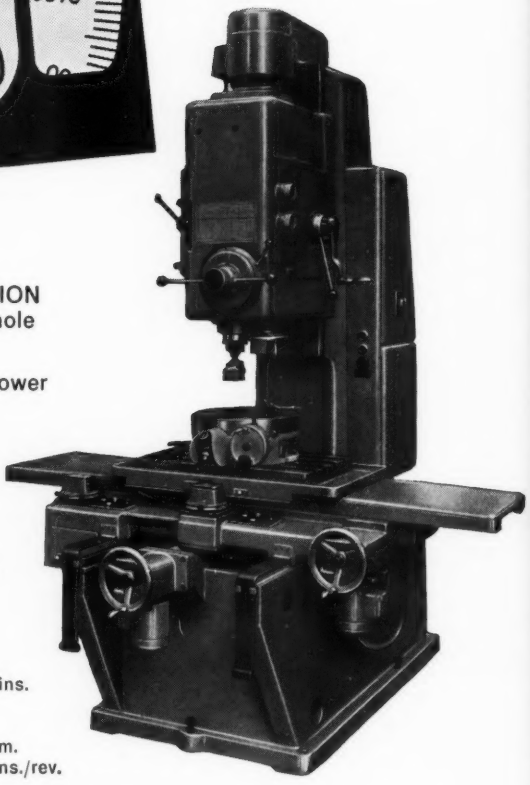
Model VLP600



now available with

PROJECTION OPTICS

by LEITZ



- Co-ordinate readings by LEITZ PROJECTION OPTICS with adjustment for setting from whole numbers.
- Twelve spindle speeds with four reversible power feeds for each speed.
- Automatic disengagement of feed at preset point.
- Hardened and lapped quill with spindle running in precision roller bearings.
- DC injection spindle brake with push button control.

BRIEF SPECIFICATION

Table size	28ins. by 16ins.
Longitudinal travel of table	26ins.
Cross travel of table	16ins.
Spindle speeds (12)	30-1420 r.p.m.
Spindle feeds (4)	0·0012-0·01ins./rev.

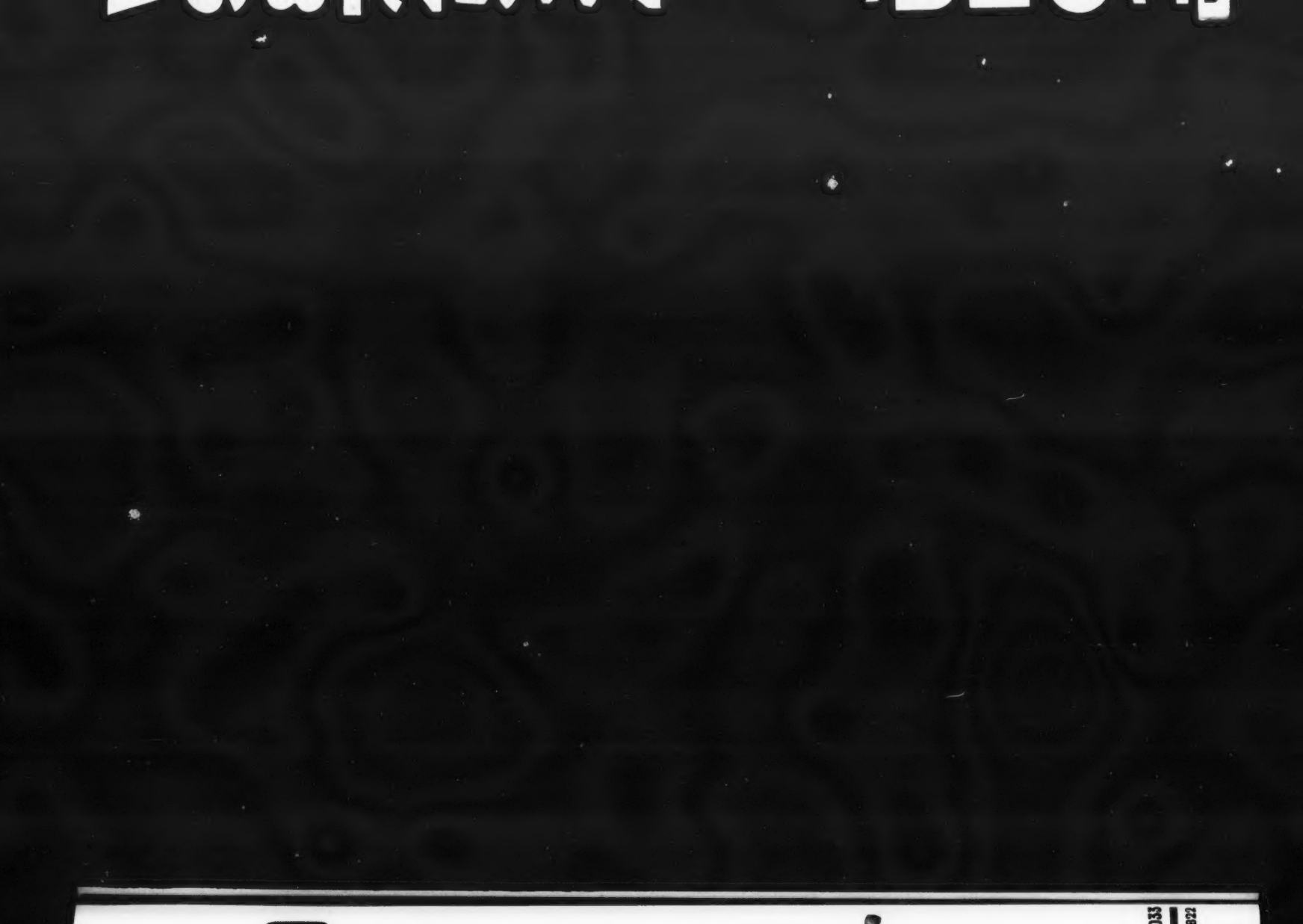
ROCKWELL
MACHINE TOOL CO. LTD.

For further particulars write or telephone TODAY

WELSH HARP, EDGWARE RD., LONDON, N.W.2. TEL: GLADSTONE 0033

ALSO AT BIRMINGHAM—TEL: SPRINGFIELD 1134/5 • STOCKPORT—TEL: STOCKPORT 5241 • GLASGOW—TEL: MERRYLEE 2822

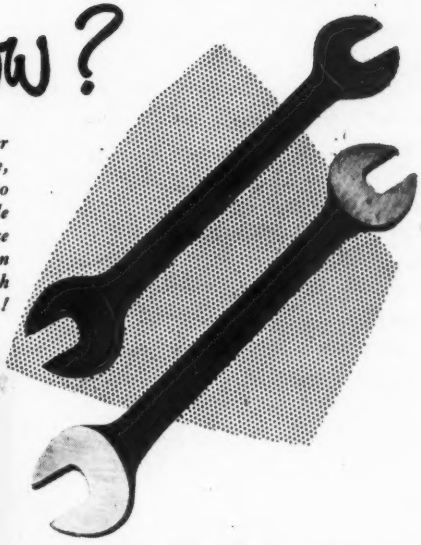
ABA3

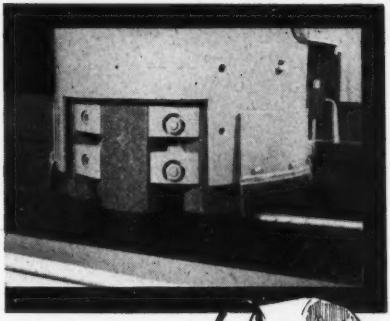


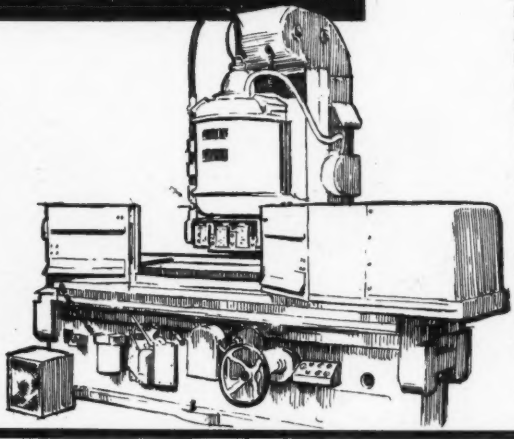
June 7

Do you know?

That you can get higher production with better finish at lower cost on vertical spindle, segmental surface grinding. By changing to ALOXITE vitrified segments, it was possible to reduce the abrasive cost of grinding these spanners by more than 5% — this is quite an item when you're grinding in quantities such as our customer does. And look at the finish!







Here are the production figures:

COMPONENT GROUND
Open-end spanners, 11" long x ⅜ and ½ Whit.

MATERIAL
EN47 chrome vanadium alloy steel.

ABRASIVE
Segments AA46 — J5 — VL.

NUMBER GROUND
200 dozen spanners per set of segments.

ABRASIVE COST
0·725 pence per dozen.

•

CARBORUNDUM can help you to achieve this kind of production and economy. And not only on segmental grinding. Whatever your grinding process, whatever your problem, we have experts who can advise on the best and most efficient use of abrasive materials. Write and ask for a representative to call.

•

ALOXITE is a registered trade mark of the Carborundum Company Limited.

BONDED ABRASIVES DIVISION

THE CARBORUNDUM COMPANY LTD
TRAFFORD PARK, MANCHESTER 17
Telephone TRAfford Park 2381 Telegrams CARBORUND, TELEX, MANCHESTER

- **4,000 Sparking Plugs marked per hour**
- **1,800 Ball Pins marked per hour**
- **1,400 Ball Race Rings marked per hour**

by PLANETARY MARKING MACHINES

Capable: Periphery or flat end marking

Adaptable: Can be hopper or hand fed

Versatile: Mandrel support for thin-wall articles, ball race rings, etc.

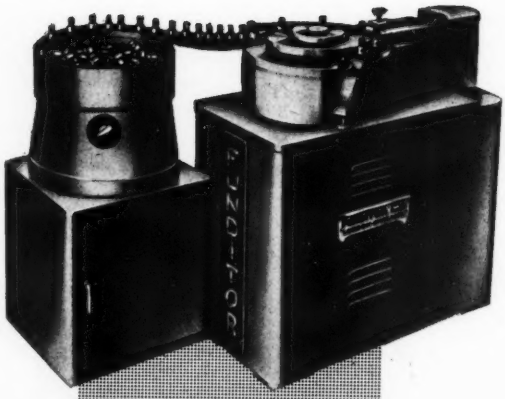
Uniform: Pneumatic Compensator ensures regular marking depth

Automatic: Ejector Finger effects automatic ejection

Simplicity: Typeholders easily set up for various operations

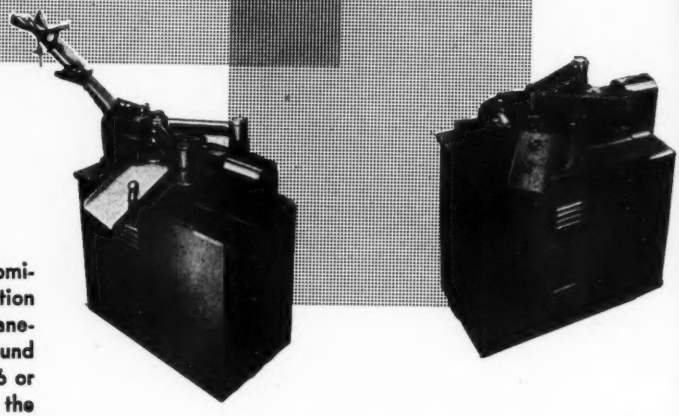
Accurate: Specific marking location if needed

It's easy to create the right impression with



FUNDITOR

PLANETARY MARKING MACHINES



The most acceptable and economical results in High Production Marking are obtainable on Planetary Machines **alone.** Built around one or two basic units with 4, 6 or 8 workholding stations fulfilling the requirements of numerous marking operations. Purpose designed they are ideally suited for integration into existing production lines.

Electric lamp sockets, ball races, socket wrenches, bushes, small calibre ammunition, thinwall tubes, pressings with protruding lugs, ball pins, automotive parts, textile machine spindles, etc., etc.

FUNDITOR LIMITED

3 WOODBRIDGE STREET, LONDON, E.C.1

PHONE: CLERKENWELL 6155/57 CABLES: FUNDITORS, CENT. LONDON

Schneider

SURFACE GRINDING MACHINE

IMMEDIATE DELIVERY FROM STOCK

MODEL JOH2

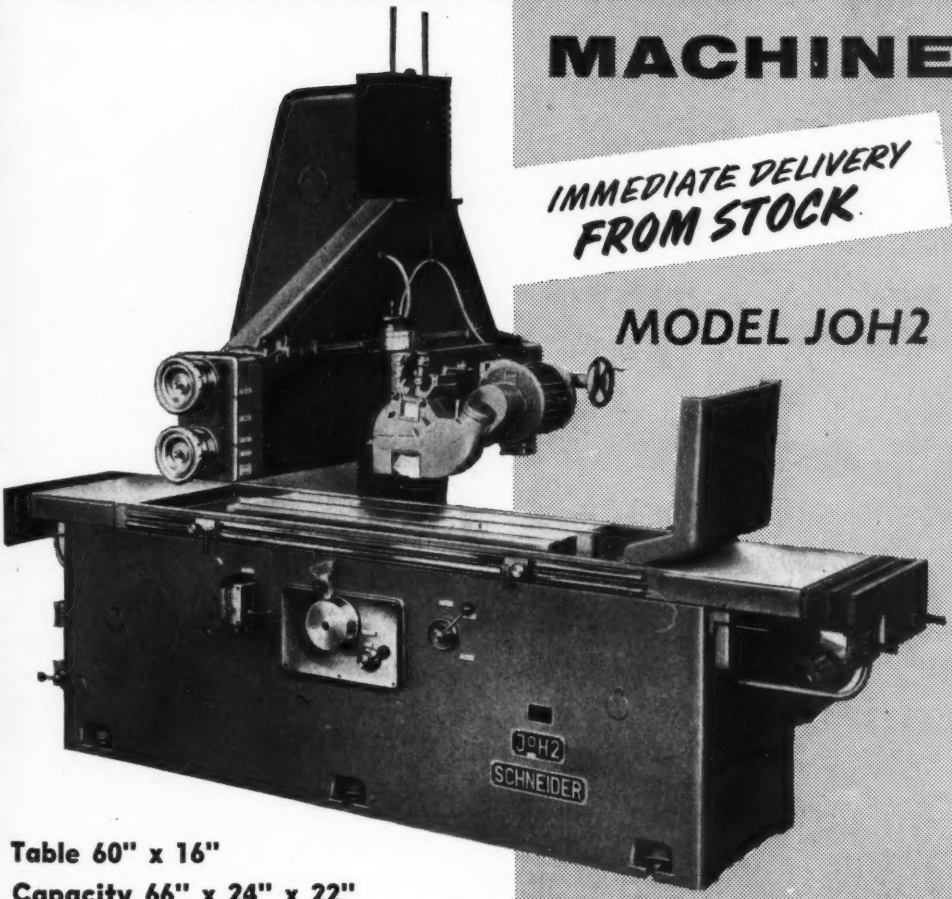


Table 60" x 16"

Capacity 66" x 24" x 22"

Please send for full details.

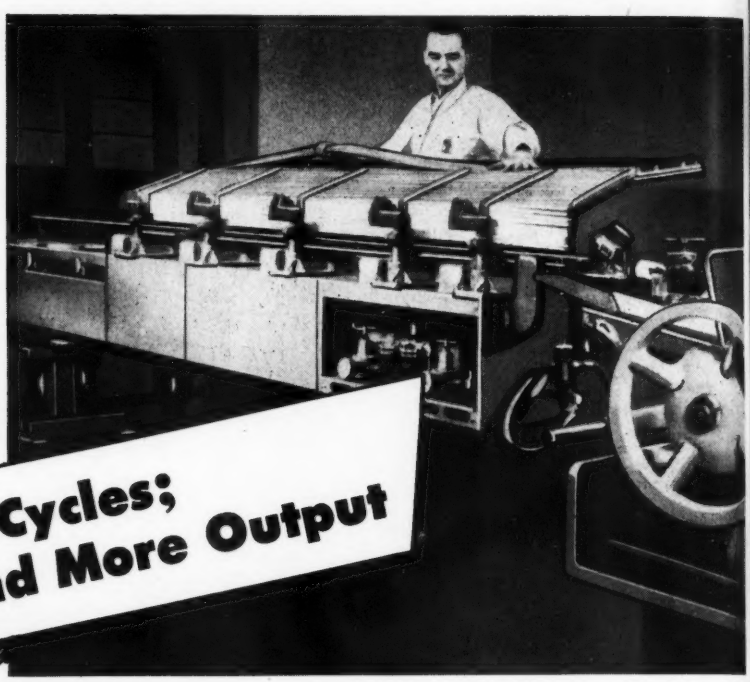
EXCLUSIVE DISTRIBUTORS IN THE UNITED KINGDOM

ELGAR MACHINE TOOL COMPANY LIMITED

172-178 VICTORIA ROAD · ACTON · LONDON W3 · Telephone ACORN 5555
MIDLANDS SHOWROOM: 1075 KINGSBURY ROAD, ERDINGTON, BIRMINGHAM 24. Tel: Castle Bromwich 3781/2
SOLE SCOTTISH AGENTS: ANGUS & CRICHTON (SALES) LTD., 7 MIDLAND STREET, GLASGOW C.1. TELEPHONE: CITY 4561
NRP 3461

When answering advertisements kindly mention MACHINERY.

D2



Faster Cycles; and More Output

with Less Fatigue and Higher Sustained Production

Machine speed — not worker efficiency — governs production on automatics equipped with Lipe Automatic Machine Loading Bar Feed. That's because Lipe takes over the tedious, back-breaking hand-loading — leaves the machinist free to concentrate on quality . . . machine set-ups . . . care of tools.

The **LIPE AML Bar Feed**

automatically and continuously feeds stock of practically any length, shape or material in close-tolerance feedouts. Users report production increases of 40 per cent. . . . 90 per cent. . . . even 200 per cent. per machine, plus labour benefits that are even more important.

Stop Cutting Air and you Start Cutting Costs

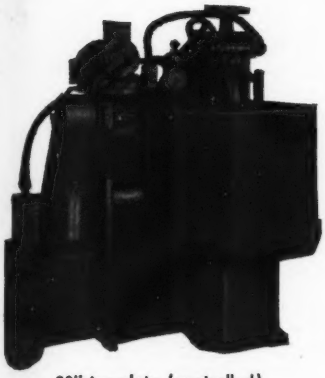
Send for Data to Dept. M.3351
Patents Nos. 728898, 743461 and 827417

Automation Ltd.
DEVONSHIRE HOUSE VICARAGE CRESCENT LONDON S W 11
PHONE: BATTERSEA 5549

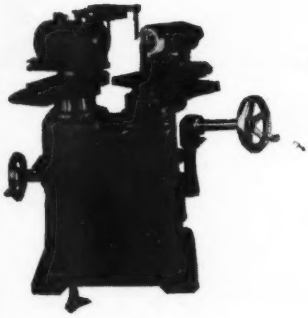
NRP 3487

OLIVER

PRECISION TOOL GRINDING EQUIPMENT



20" template (controlled)
TOOL BIT GRINDER



The Oliver No. 2
ARC RADIUS GRINDER

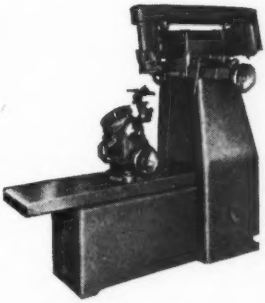
Sole Agents :

Variable clearance,
variable point
No. 510 DRILL
POINTER

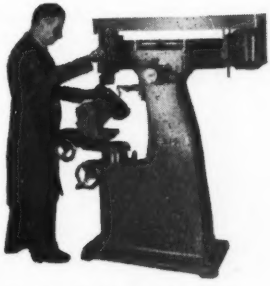
Completely Automatic
FACE MILL GRINDER

All machines, made by one of the World's most famous manufacturers, are available for early delivery from their Sole Agents in Great Britain:

For low cost drill reclaims
DRILL POINT THINNER



Oliver heavy-duty
'ACE' GRINDER



Hand operated
FACE MILL GRINDER

Selson MACHINE TOOLS

The Selson Machine Tool Co. Ltd

SUNBEAM ROAD, LONDON, N.W.10. Telephone Elgar 4000

STANNINGLEY, Near LEEDS Telephone Pudsey 2241

And at Kingsbury (Nr. Tamworth), Manchester, Glasgow, Swansea, Newcastle-on-Tyne, Sheffield, Southampton, Belfast, Bath

600 GROUP

Speed production

WITH FULLY AUTOMATIC DRILL *plus* PITCH CONTROLLED TAPPING

Quickly and easily set for drilling, reaming, spotfacing and tapping holes up to 2½" dia., on 9" - 40" P.C.D. in flanges, rings, discs, etc. Provision for fully automatic control of spindle: rapid approach, drill feed, withdrawal, tapping feed, spindle reversal, table indexing or combinations of these with manual operation for any selected movements. 12 speed spindle in hydraulically actuated quill with 12" traverse and infinitely variable feeds between ½" and 12"/min; rapid approach at 230"/min. and withdrawal at 470"/min; 36" dia. indexing table driven through worm gear by independent ½ H.P. motor. For full details, send for illustrated leaflet D.25.

JAMES ARCHDALE & CO. LTD.
BLACKPOLE WORKS : WORCESTER
Tel: Worcester 27081 (7 lines)

Sole Selling Agents: Alfred Herbert Ltd. Coventry
Tel: Coventry 89221

ARCHDALE

HIGH-SPEED

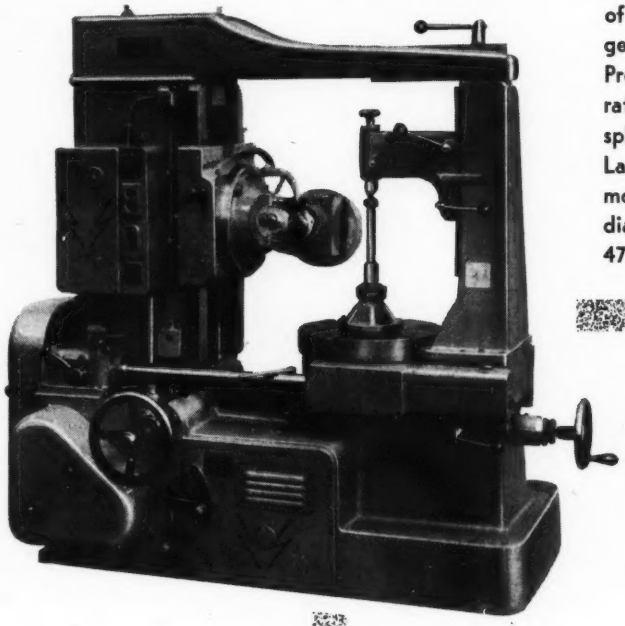
VERTICAL DRILLS

WITH AUTO-INDEXING ROTARY TABLE

1 or 10,000 off

MMT

The Almhult KF1 is designed for economic, precision hobbing of single, large or small batch gears.
Produces spurs, helicals, ratchet wheels, worms and splines.
Larger machine available, model KF2, maximum gear diameter that can be hobbed 47".



ÄLMHULT AUTOMATIC GEAR HOBBER KF1

✳ ECONOMIC
✳ ACCURATE
✳ VERSATILE

SPECIFICATION

Max. gear diameter that can be hobbed	23½"
Min. centre distance, cutter spindle-table	1½"
Vertical travel of hob head slide	17 5/16"
Table diameter	19½"
Table worm wheel indexing diameter ...	16"

MORTIMER

EXCLUSIVE DISTRIBUTORS OF THE FINEST MACHINE TOOLS

NRP 5155

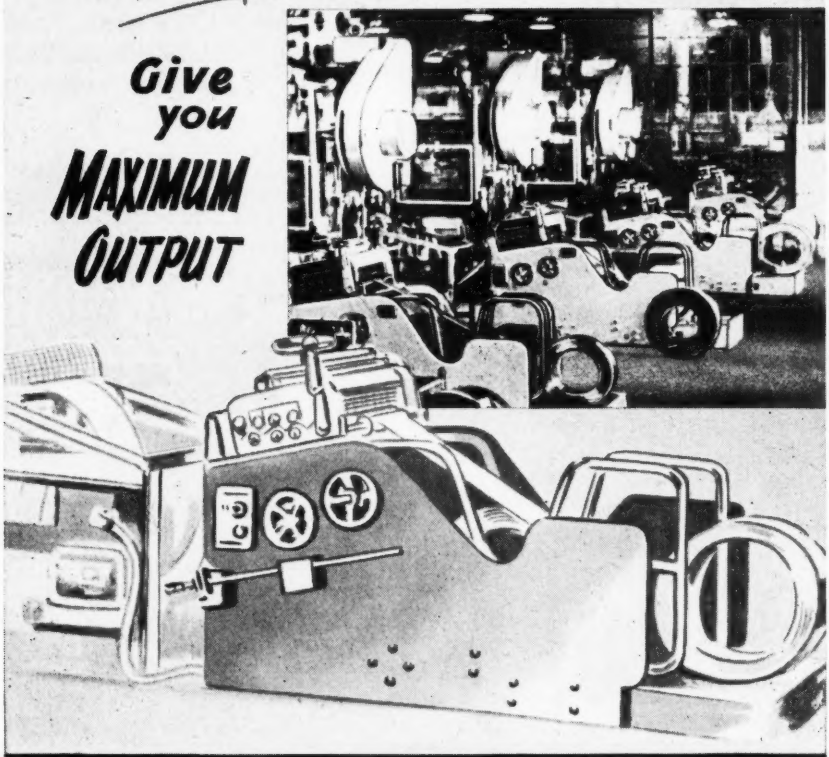
MORTIMER MACHINE TOOL CO. LTD · MORTIMER HOUSE · ACTON LANE · LONDON NW10 · Tel: ELGar 3834-5-6

ONLY

BHP 'Auto Feed'

mechanised COIL CRADLES

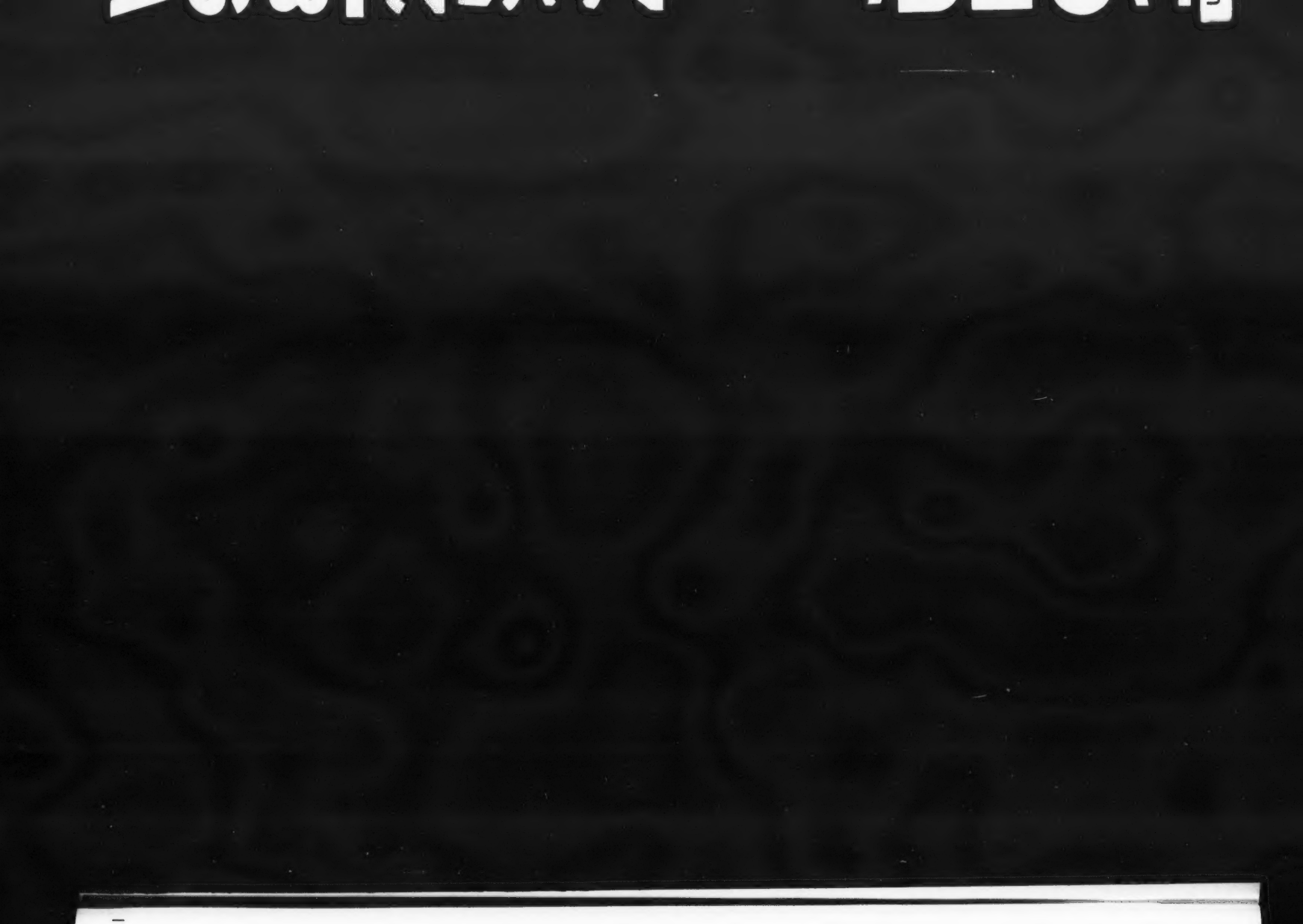
Give you MAXIMUM OUTPUT



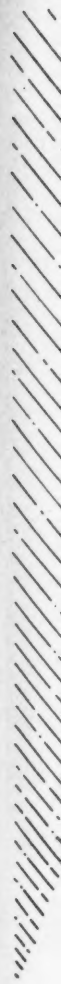
B.H.P. MACHINE TOOL CO. LTD.

91 · WATTVILLE ROAD · BIRMINGHAM 21 · ENGLAND

TELEPHONE: NORthern 6220 · 6623



June



BU

A D

U.S.A.
Technis
BURG
tiebolag
(Johann

TURNED OUT FINE AGAIN...

ALMCO SPEED FINISHING

GIVES THE SAME UNIFORM FINISH EVERY TIME . . . TEN TIMES FASTER

Using Almco Supersheen barrel-finishing equipment and materials, *unskilled* operators can turn out *precision* DEBURRING, DESCALING, BURNISHING, POLISHING, etc., with practically no rejects, with savings of up to 87%, at ten times the speed of hand-finishing.

To prove to yourself that such savings are realities, we invite you to send any unfinished component you choose to our development laboratory where it will be processed FREE OF CHARGE. Its finished appearance—together with the detailed report provided—will convince you that Almco products are *essential* in keeping pace with modern production methods.

Why not ask us to call? Or, better still, call and see your own products undergoing processing.

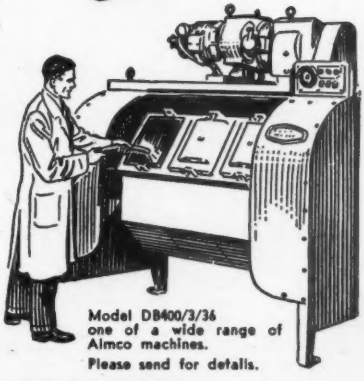
ALMCO

Supersheen

BURY MEAD WORKS : HITCHIN : HERTS

Telephone: Hitchin 3669

A Division of the King Seeley Corporation, Ann Arbour, Michigan, U.S.A.



Model DB400/3/36 one of a wide range of Almco machines. Please send for details.

U.S.A. Almco Division, Albert Lea, Minnesota. HOLLAND (Rotterdam) N.V. Technische Handelsonderneming "Carborundum Aloxite" BELGIUM & LUXEMBURG (Bruxelles) Tecnimetal Societe Anonyme. SWEDEN (Stockholm) Trumlingsaktiebolaget. SWITZERLAND (St. Gallen) L. Kellenberger & Co. SOUTH AFRICA (Johannesburg) Barry Colne & Co. (Pty.) Ltd. AUSTRALIA & NEW ZEALAND (Melbourne) Hardie Trading Ltd.

SPARCATRON Mk.V

for spark machining large workpieces from the solid

This machine has been introduced for handling workpieces larger than can be conveniently accommodated in the earlier models and has been produced with the forging industry in mind for the production of dies.

End plate of an electric motor.

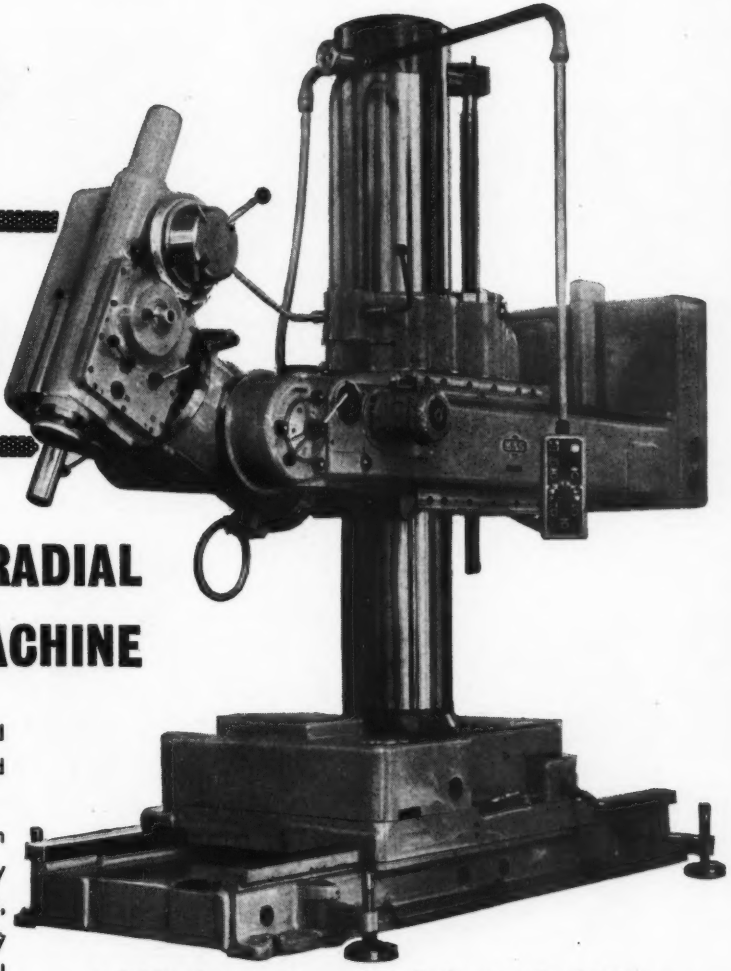
IDP

IMPREGNATED DIAMOND PRODUCTS LTD
OF GLOUCESTER : ENGLAND

When answering advertisements kindly mention MACHINERY.

MAS

VRM 50A



UNIVERSAL RADIAL DRILLING MACHINE

For drilling, reaming and thread cutting large and bulky workpieces.
Ideal for heavy duty work in Production and Assembly shops such as bridge building, boiler construction, railway and shipbuilding yards. All movements are easily controlled by push-buttons on a pendant arm.

- Drilling Capacity 2"
- Spindle Speeds (15) 16-800 r.p.m.
- Drilling Motor 5 h.p.
- Arms swivels through 360°.

IMMEDIATE DELIVERY.

THE BIG MACHINE FOR THE BIG JOB!

EXCLUSIVE DISTRIBUTORS IN THE UNITED KINGDOM.

ELGAR MACHINE TOOL COMPANY LIMITED

172-178 VICTORIA ROAD · ACTON · LONDON W3 · Telephone ACORN 5555
MIDLANDS SHOWROOM: 1075 KINGSBURY ROAD, ERDINGTON, BIRMINGHAM 24. Tel: Castle Bromwich 3781/2
SOLE SCOTTISH AGENTS: ANGUS & CRICHTON (SALES) LTD., 7 MIDLAND STREET, GLASGOW C.1. TELEPHONE: CITY 4560
3205

SENSIBLE SAFETY

Everybody understands why dangerous animals have to be kept behind bars, and so instances of people being injured by caged wild animals are fortunately rare.

Moving machinery and tools can also inflict serious injury, and it is no less important that these, too, should be securely guarded and fenced.

Safety First with

'HARCO' MACHINERY GUARDS

'Harco' Machinery Guards are purpose made for every type of machinery, and are constructed to afford complete protection without interfering with efficient operation. They are strongly made from stout wire mesh to withstand vibration and rough treatment, and all 'Harco' Guards fully conform to Factory Act requirements. The complete Harvey service covers advice, design and installation, and List No. 996 shows many types already supplied.

HARVEY FACILITIES AND PRODUCTS

CLASS I WELDED PRESSURE VESSELS TO LLOYD'S AND A.S.M.E. CODES · HEAT TREATMENT AND RADIOGRAPHY · 'ROTARPREST' HEADS FROM 5 FT. TO 15 FT. DIA.—*Larger sizes to specification* · WELDED PRESSURE VESSELS AND FABRICATIONS IN ALL METALS STEEL PLATE AND SHEET METALWORK HEAVY MACHINING AND FITTING PERFORATED METALS WOVEN WIRE WIREWORK STEEL STORAGE EQUIPMENT

HARVEY

G. A. HARVEY & CO. (LONDON) LTD., WOOLWICH ROAD, LONDON, S.E.7

Telephone: GREenwich 3232 (22 lines)

WW/3

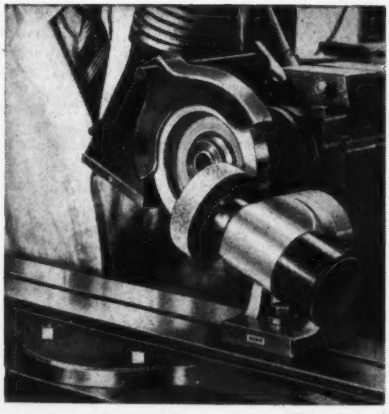
30%

OF ALMOST EVERY DIAMOND WHEEL

is NEVER USED UP!

the 'HABIT' ROTATRIM

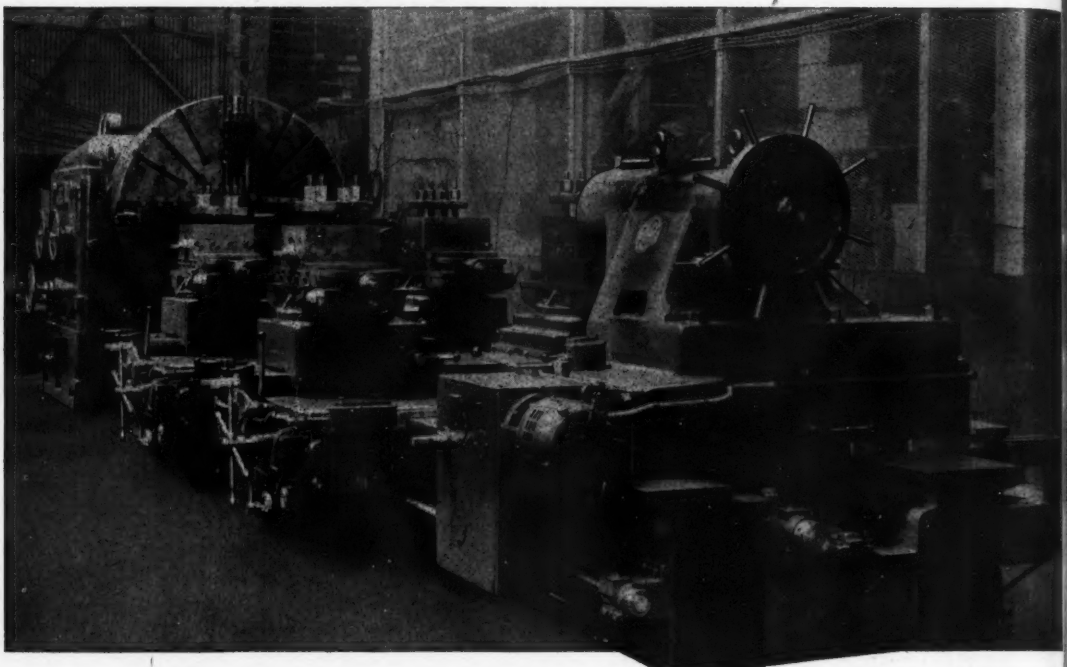
TRUING DEVICE



increases the effective life of diamond wheels by precise and minimum removal of surface material. Truing to 'ZERO' accuracy—whilst dressing the wheel — is now possible with the Rotatrim which uses a relatively inexpensive abrasive wheel. Completely automatic in operation and self-powered by contact with the grinding wheel. *For full details and technical literature write to:*

'HABIT'

HABIT DIAMOND TOOLING LIMITED
LURGAN AVENUE, LONDON, W.6 · TELEPHONE FULHAM 7944
Telegrams HABIT, LONDON, W.6



CLYDE BUILT SMT GLASGOW MACHINE TOOLS

HEAVY DUTY LATHES

This 36in. height of centres machine is typical of the heavy duty lathes which we manufacture, from 21in. to 60in. height of centres. In addition, we have available surfacing and boring lathes and sliding bed break lathes. All are built to the highest standards of accuracy and with the best materials and workmanship. In general, the range is designed for the heaviest class of work, but we also build some machines intended for light work on large and heavy components.

The lathe illustrated has two saddles, each with two tool posts and quick power traverses are applied to all motions. These traverses and the main drive are controllable from push button stations on each saddle, ensuring the maximum speed and ease of operation. Different ranges of spindle speeds are available to suit the class of work to be done and screw cutting can be provided or omitted as desired. Likewise power feed to the top slides is optional and, if specially required, a screw cutting motion is possible at this point.

The photograph shows clearly the massive construction of our lathes, the proportions of the bed being shown very clearly. The narrow guide for the saddle is on the front shear. The spindle bearings are of very ample size to deal with the loads involved and all fast running shafts are carried on ball or roller bearings. The loose head is of massive design and carries a running spindle. We have a number of types of loose head, including one with a full scale spindle, complete with chuck.

Steadies are available in a number of different patterns, including the open type for very large work. Boring bars and other special tooling can be supplied in accordance with customers' requirements. Taper turning can be by tangent bar or, if required, by gearing, and short steep tapers can be machined using the swivelling top slides with power feed. We are also pleased to investigate the possibility of supplying hydraulic copying devices to suit specific jobs.

We invite your enquiries for large lathes as well as the other machines which we build and we are always happy to arrange for a visit of one of our technical representatives to discuss your requirements and problems.

SCOTTISH

MACHINE TOOL CORPORATION LTD.

17 Lynedoch Cresc., Glasgow, C.3.
DOUGLAS 6586/9

Lion House, Red Lion St., Richmond, Surrey
RICHMOND 7667/9

256 Moseley Road, Birmingham, 12.
CALTHORPE 2541

The Building Centre, Brunswick Ter., Leeds, 2.
LEEDS 25250

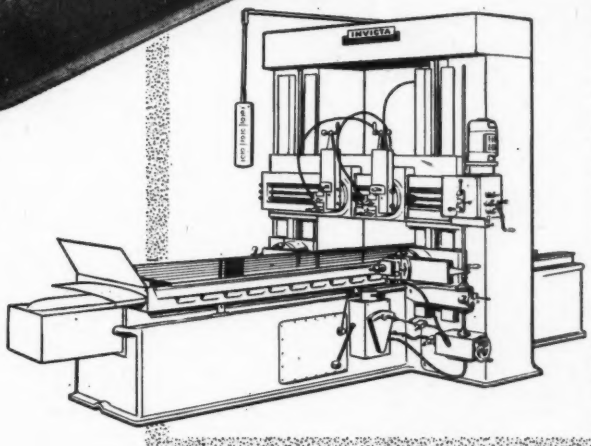
INVICTA
HYDETSCO

hydraulically operated

PLANERS

- **Open-sided Models 17 sizes 3' x 3' x 2' 6" up to 14' x 4' 6" x 3' capacity.**
- **Infinitely variable table speeds with quick return.**
- **Hydraulic tool lift.**
- **Automatic lubrication of bed ways.**
- **Rapid vertical traverse of cross rail standard.**
- **Centralised controls.**

TWELVE DOUBLE COLUMN MODELS
8' x 4' x 3' — 14' x 5' x 3'



Additional tool head on cross rail. Milling heads. Grinding heads. Rapid cross traverse of heads. Outer support for cross rail. Concertina guards for all ways are available to order.

B. ELLIOTT (MACHINERY) LTD

(MEMBER of the B. ELLIOTT GROUP)
VICTORIA WORKS · WILLESDEN · LONDON · N.W.10
Tel: ELGAR 4050 (14 lines) Grams: Elliottona, Harles, London
Overseas Subsidiaries CANADA · U.S.A. · AUSTRALIA · S. AFRICA

ELLIOTT OF LONDON GROUP

NRP 5074

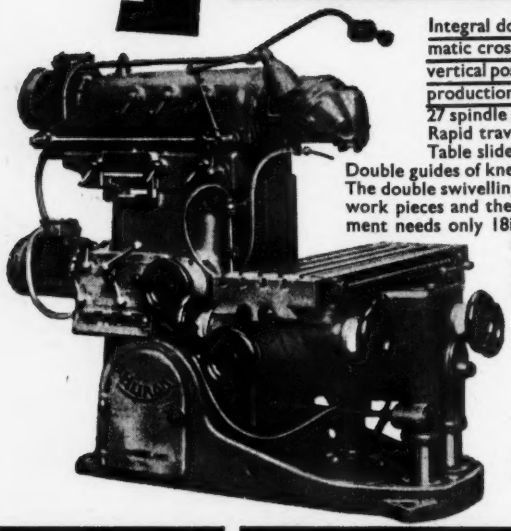
When answering advertisements kindly mention MACHINERY.

SLIDING RAM GIVES 27½in. AUTO CROSS FEED

HEAVY DUTY MILLING

ANGULAR COMPOUND HORIZONTAL VERTICAL

HURON SUPER UNIVERSAL MILLERS



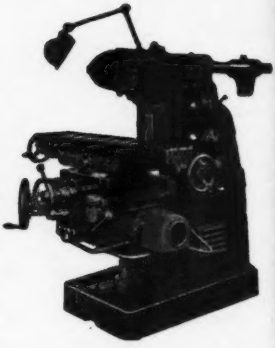
Integral double swivelling universal head provided with 27½in. automatic cross feed by the sliding ram, can be set to the horizontal or vertical position, or to any angle instantaneously—permits the heaviest production cuts. Head can be retracted completely from table line. 27 spindle speeds from 30 to 2,066 r.p.m., 27 feeds from $\frac{1}{16}$in. to 30in. Rapid traverses in all directions. All operating controls duplicated. Table slides directly in the knee without cross movement or swivel. Double guides of knee permit components in excess of 1½ tons to be machined. The double swivelling universal head requires an opening of only 14in. to enter work pieces and the whole sliding ram with its 27½in. automatic cross movement needs only 18in. clearance. OPTIONAL EXTRA FEATURES: Mounted spacing casting assemblies providing additional 8in. capacity under spindle. 26in. wide 8 T-slot tables and 39⅜in. automatic cross feed of sliding ram with special heavy duty knee and front operating position.

Type	Table	Automatic Feeds Long	Cross	Vert.
KU4	56⅛in. × 15⅝in.	43½in.	27½in.	19⅝in.
KU5	64⅛in. × 15⅝in.	51½in.	27½in.	19⅝in.
KU6	78⅛in. × 16½in.	59in.	27½in.	19⅝in.
KU55	64⅛in. × 26in.	51½in.	38⅛in.	18⅝in.
L83	157in. × 59in.	118in.	39⅜in.	59in.

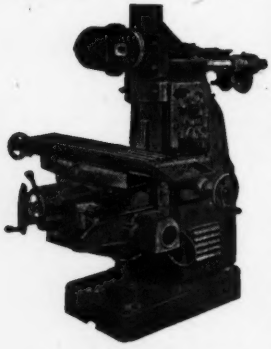
Type 'L' Open-side Traversing Head Universal Miller will mill, bore, slot and drill the largest work-pieces at one setting. The unique design permits greatest variety of operation on large work-pieces; the component remains stationary on the large work-table. Upright slides full length of base table and the sliding ram moves vertically and horizontally.

DUFOUR UNIVERSAL MILLERS

WITH DOUBLE UNIVERSAL SWIVELLING HEAD, RETRACTABLE SLIDE BRACKET AND SPACING CASTING GIVING 26" DAYLIGHT ON No. 59 AND 21" ON No. 61



FOR ALL MODELS Direct reading dial change for speeds and feeds. All parts subject to wear hardened and ground and completely interchangeable. Built to closest tolerances. Rapid traverses in all directions. Table swivels 30°. No. 40 taper for main horizontal spindle, double swivelling universal head, dividing head and rotary table. Hardened and ground centre guide for slideways. Twin overarms. Double swivelling sliding spindle heads with speeds 53-3000 r.p.m. Double swivelling universal head on retractable slide bracket providing with 5½in. Spacing Casting Drive assembly on 59 Machine 26in. daylight, and 21in. on No. 61.



MODELS 53 & 61. 16 universal head spindle speeds 21-1600 r.p.m.; 8 horizontal spindle speeds 21-1180 r.p.m.; 8 automatic feeds ½-18¾in.

MODEL 59. 36 universal head spindle speeds 14-1780 r.p.m.; 12 horizontal spindle speeds 21-1180 r.p.m.; 16 automatic feeds ½-20in.

MODEL 54. Automatic cross feed of universal head 20in.; 18 universal head spindle speeds 12-1500 r.p.m.; 36 horizontal spindle speeds 6-1500 r.p.m.; 18 automatic feeds ½-23½in.

Type	Table	Automatic Feeds Long.	Cross	Vert.
53	43½in. × 9⅝in.	27½in.	9⅝in.	15⅝in.
61	47½in. × 10⅝in.	30½in.	9⅝in.	15⅝in.
59	51⅛in. × 11⅝in.	34½in.	11⅜in.	21⅛in.
54	67in. × 14⅝in.	43½in.	14⅝in.	20⅝in.

Send for full particulars of our very extensive range of these machines; ask for demonstration.

Rudolph Carne & Co. Ltd. SWAN WORKS, FISHERS LANE, CHISWICK, LONDON, W.4.

Telephone: CHISWICK 0514 & 6585. Inland Telegrams: RUDCAR, CHISK, LONDON. Overseas Telegrams: RUDCAR, LONDON.

MAXIPILOT

AUTOMATIC MULTI-CYCLING HYDRAULIC COPYING LATHE

for fast, accurate high-output production

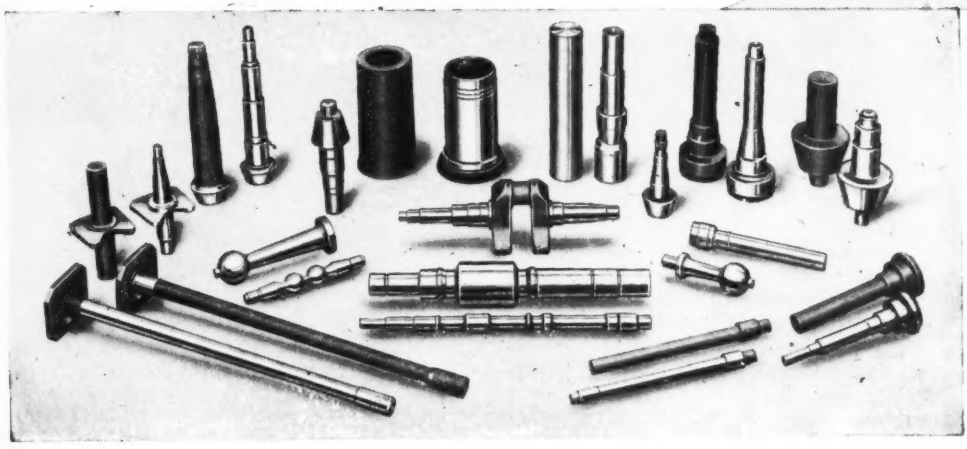
All the components shown below can be produced automatically at fast rates and with high accuracy by copy turning on this rigid and powerful machine which has been designed to exploit to the maximum the cutting possibilities of carbide tools on medium and large quantity production runs. Top speed higher than usual for a machine of this size and special attention has been given to the elimination of all vibration.

The Maxipilot is made with 20in. or 32in. between centres and maximum swing 16in. over bed; 9 in. over the cross slide. Write today for full details.

DRUMMOND BROS. LTD.

GUILDFORD · ENGLAND

Member of the Asquith Machine Tool Corporation



Sales and Service for the British Isles

DRUMMOND-ASQUITH LIMITED

Member of the Asquith Machine Tool Corporation

KING EDWARD HOUSE, NEW ST., BIRMINGHAM *Phone Midland 3431* *Also at LONDON Phone Trafalgar 7224 & GLASGOW Phone Central 0922*

D262 E

QUICK ON THE UPTAKE...

. . . just like a Dunlop Flexible Pipe. And, speaking metaphorically, just like Dunlop technicians when called upon to solve the problems of industries using oils, chemicals, water, air and steam. For discharge, high pressures or low, Dunlop Flexible Pipe Assemblies of every type are proving their efficiency and reliability the world over. Production in *your* business could well go up through Dunlop pipes. Write now and find out how.

DUNLOP HOSE

DUNLOP MAKE HOSE BETTER TO LAST LONGER

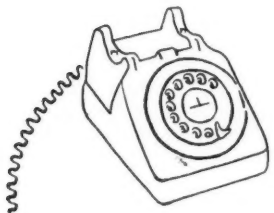
DUNLOP RUBBER CO. LTD., (HOSE DIVISION), EARLSWAY, TEAM VALLEY, GATESHEAD 11

CFH/1141/D2

Reputations have been built on the consistent high quality of

TRUBRITE

Stainless Steels



LEE invite enquiries, offer assistance and advice on specific problems and can make immediate deliveries in most categories of Stainless Steel Strip for Deep Drawing, Bending and Forming, Blanking and Shearing, General Presswork, Spinning and Punching.

ARTHUR LEE & SONS LTD

RING SHEFFIELD 387272

Trubrite Steel Works, Meadow Hall, Sheffield.
Also at London and Birmingham.

Forst

BROACHES

We are proud to announce that the internationally famous

Forst
BROACHES
are now being made in England

★

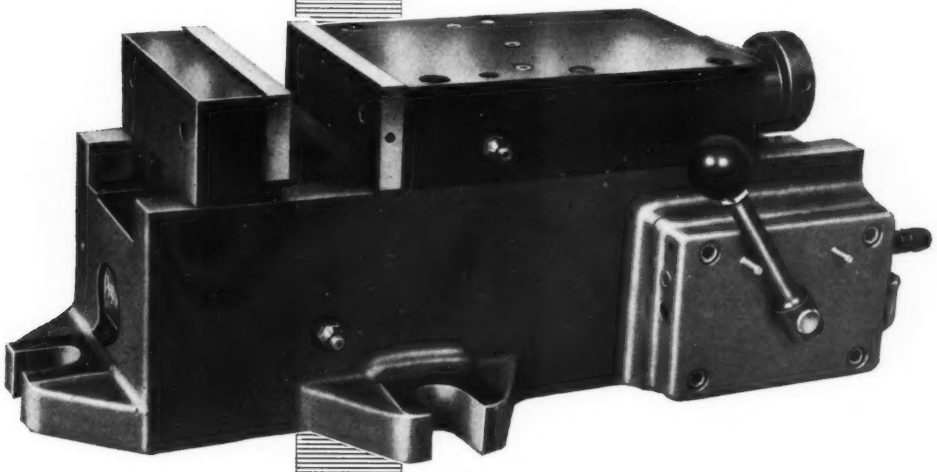
THE COMPANY WISHES TO NOTIFY CUSTOMERS THAT FROM APRIL, 1961, ALL SALES, SERVICE, ETC., OF 'FORST' BROACHING MACHINES AND BROACH GRINDING MACHINES, MADE IN GERMANY, WILL BE OPERATED FROM THE UNDERMENTIONED ADDRESS.

We welcome your enquiries for broaches of all kinds, particularly for turbine blades and stainless steel and Nimonic parts.

Forst **BROACH COMPANY (G.B.) LTD.**

DARTFORD ROAD., LEICESTER · TEL.: LEICESTER 31134.

TELEX NO. 34634 FORST GB LESTER



The PRATT

PNEUMATIC MACHINE VICE

PRINCIPAL DIMENSIONS

Width of Jaw	4⅛″	6″
Depth of Jaw	1⅜″	1⅞″
Maximum Opening	2½″	4½″
Minimum Opening	0″	1¾″
Power Movement	½″	½″
Gripping Force at 80 P.S.I.	4,800 lbs	7,700 lbs
Length Overall	15½″	19½″
Width Overall	7½″	9½″
Height Overall	5½″	6⅛″
Weight (approx.)	54 lbs	126 lbs

- RAPID OPERATION
- HIGH GRIPPING POWER
- NO OPERATOR FATIGUE
- ROBUST CONSTRUCTION
- AMPLE BEARING SURFACES

FOR INCREASED PRODUCTION

F. PRATT & CO. LTD. HALIFAX ENGLAND

Famous for Workholding for 100 Years

HEAVY DUTY

CLAMPTIP

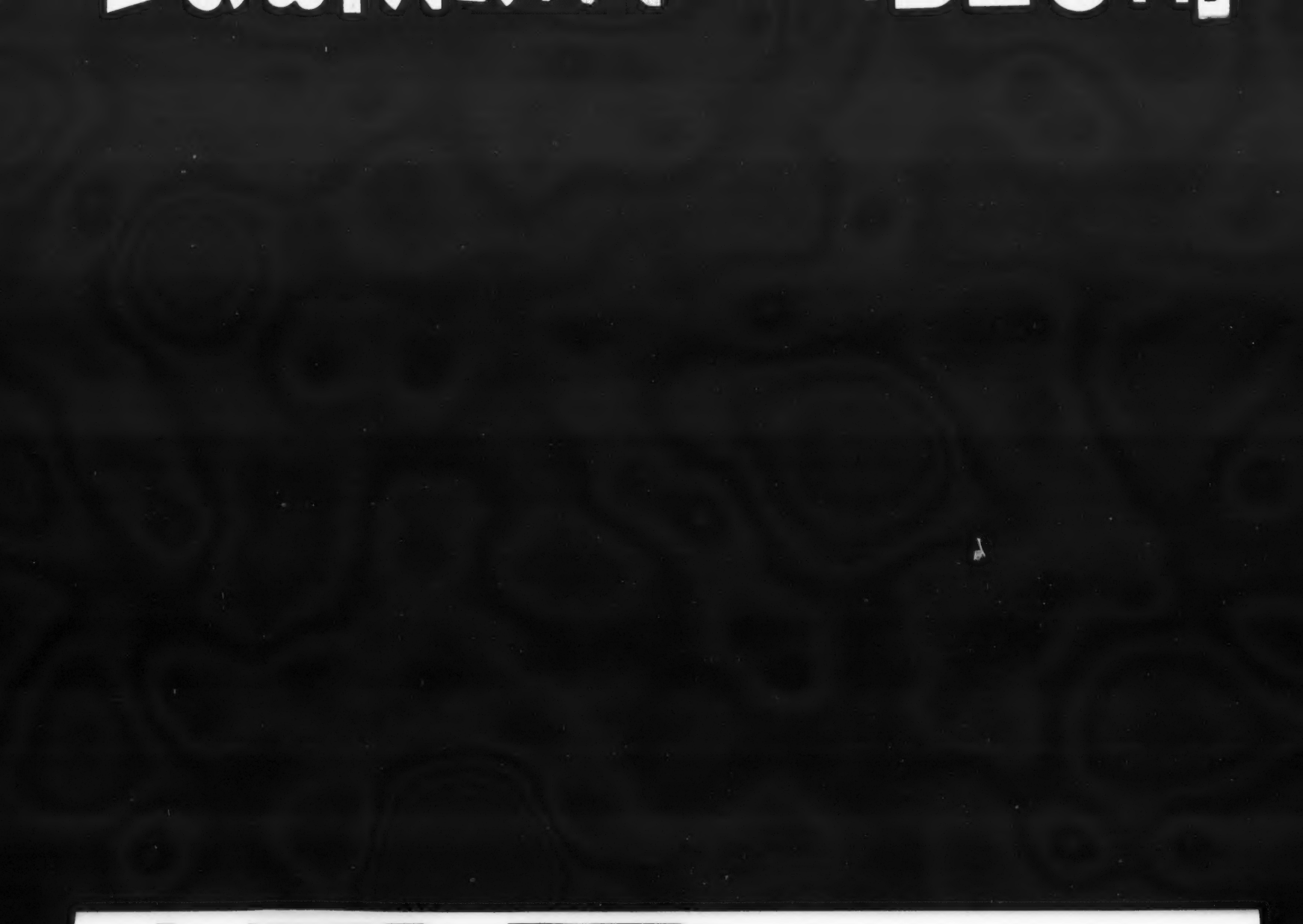
PLANING TOOLS

on the Veraloy principle perform better and cost less to buy and to regrind.
Write for particulars to :

VERALOY

VERALOY PRODUCTS LTD.

BEECH ROAD · THE MARSH · HIGH WYCOMBE · BUCKINGHAMSHIRE
Telephone : High Wycombe 2795-8. *Telegrams : Veraloy High Wycombe*



June
O
217 Westgate
NEWCAST
Tel. 20419 Te

BROOKE

CARDINAL

CARBIDE "ADJUSTABLE"
REAMERS

HAVE EXCEPTIONALLY LONG LIFE

THEY CAN BE RE-GROUND 5 to 10 TIMES

(according to diameter)

'CARDINAL' TIPS ARE GRADE "B.S.N." (I.S.O.-K20)

Adjustment by coned screw

SHELL REAMERS
These Shell Reamers fit our standard range of arbors.

TAPER SHANK REAMERS

Carbide Tipped Shell Reamers are manufactured in a range of sizes from 1in. diameter upwards, and the Taper Shank type from ¼in. diameter upwards.

Our full range of standard H.S.S. Reamers is available EX STOCK from

THE BROOKE TOOL MANUFACTURING CO. LTD.

17 Westgate Rd.
NEWCASTLE-UPON-TYNE
Tel. 20419 Telex 53136

2 St. John St., Deansgate 3,
MANCHESTER
Tel. Blackfriars 7012/3

Warwick Rd., Greet,
BIRMINGHAM 11
Tel. Victoria 2323

47 Victoria St.,
LONDON S.W.1.
Tel. Abbey 4058

R. McSKIMMING & CO.
65 West Regent St.
GLASGOW C.2.
Tel. Douglas 7391/2

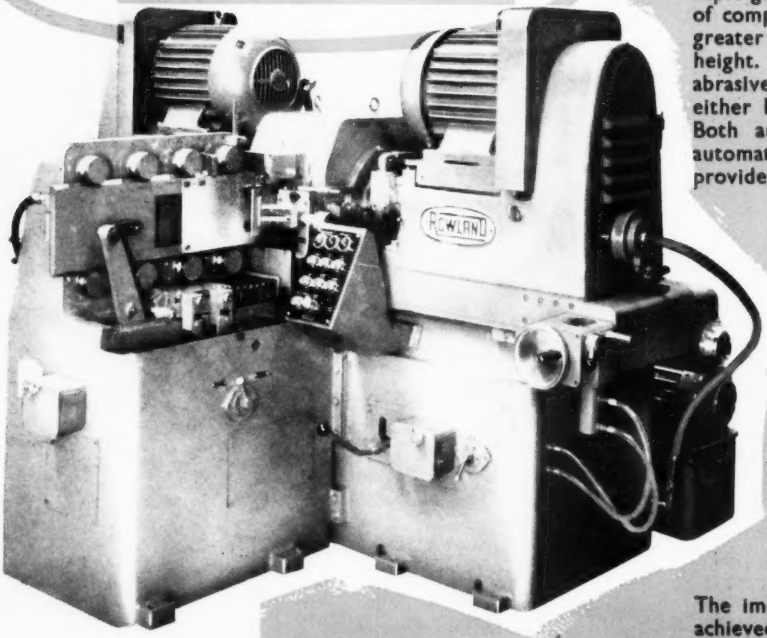
The fastest method of grinding two opposite faces

Duplex Surface Grinding by

ROWLAND

THROUGH FEED TYPE 'ADD-F'

Designed especially for extremely rapid grinding on a continuous basis of components having a width not greater than half their diameter or height. Carries up to 30in. dia. abrasive discs and is available with either 15, 25, 30 or 40 H.P. motors. Both automatic size control, and automatic feeding mechanism can be provided for.



OSCILLATING HEAD TYPE 'HDD-O'

For the smaller batches of work where rapid fixture change over time is all-important. A wide variety of components can be ground with heavy stock removal, giving exceptionally accurate results. Available with either 20in. or 30in. abrasive discs, and 20, 30 or 40 H.P. motors.

The impressive rates of production achieved on ROWLAND DUPLEX GRINDERS, coupled with the finish and close tolerances obtained, may well solve a production problem in your own works. Our experience is unrivalled in all spheres of double disc grinding. Why not contact us?

F. E. ROWLAND & CO. LTD. CLIMAX WORKS, REDDISH, Nr. STOCKPORT

TELEPHONE: HEATON MOOR 3201 TELEGRAMS: HEROIC, REDDISH

F'

ly
sis
ot
or
a.
th
rs.
nd
be

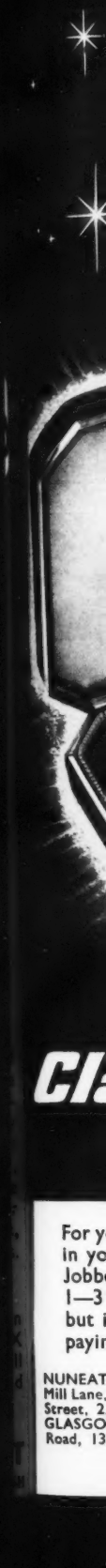
D

of
re
all-
ety
nd
al,
ate
her
cs,
rs.

on
EX
ell
led

RT
ISH

NU
Mill
Stre
GLA
Roa


CL
For y
in yo
Jobb
1—3
but i
payi
NUNEAT
Mill Lane,
Street, 2
GLASGO
Road, 13

Tapershank performance... Jobber's cost

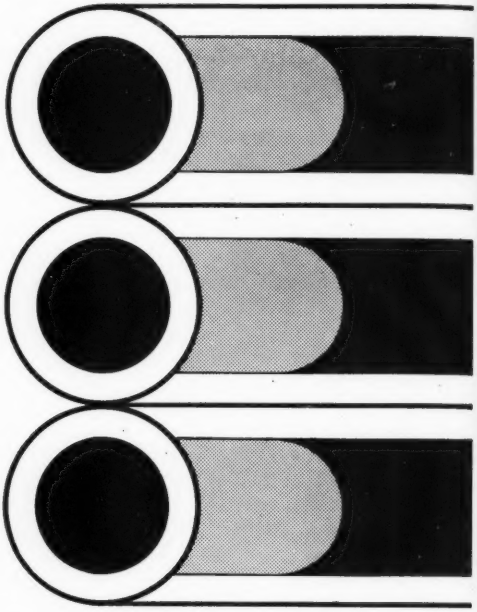
Clarkson TaperFast System

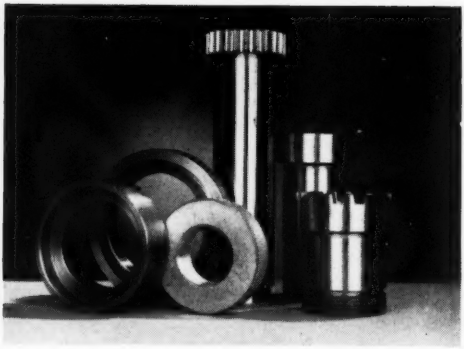
For you TaperFast means an immediate reduction in your drilling expenditure. For every size of Jobber Drill you use from $\frac{1}{8}$in.—$\frac{1}{2}$in., A—Z or 1—31, you can now use a Tapershank Drill, but it will cost you no more than you are now paying for your Jobbers. This means that you can have Tapershank performance at Jobber's price.

If you want to know more about this new advance in drilling technique, all you have to do is to write or phone your nearest Clarkson Service Centre.

NUNEATON – Warwickshire, *Nuneaton 2261* · LONDON – 124 Hammersmith Road, W.6, *Riverside 8241* · BIRMINGHAM – 15 Heath Mill Lane, 9, *Victoria 3994* – 45 Villa Road, 19, *Northern 5994* · BELFAST – 32 Shaftesbury Square, *Belfast 20025* · BRISTOL – 17 Cumberland Street, 2, *Bristol 2-8464* · COVENTRY – 119 Leicester Causeway, *Coventry 27158* · LEEDS – 93 Hunslet Road, 10, *Leeds 26369* GLASGOW – 430 Crown Street, C.5, *South 1942* · HAYES (Middlesex) – Springfield Road, *Hayes 7870* · MANCHESTER – 98 Oxford Road, 13, *Ardwick 4804* · NEWCASTLE – 241 Westgate Road, 1, *Newcastle 2-5248* · WOLVERHAMPTON – 13 Dudley Road *Wolverhampton 25443*

The saving is inside





In constructions of various types from small mechanical units and machine tools to heavy ships' engines—there are numerous parts which you can produce in an economic way from SANDVIK Mechanical Tubing. We have made the hole for you!

The components illustrated belong to a machine tool. Originally the manufacturer used bar steel, but has now changed to SANDVIK Mechanical Tubing, thereby saving money through lower material and production costs . . . improved utilization of machine tools . . . reduced tool and handling costs.

You, too, can rationalize by using SANDVIK Mechanical Tubing. We are carrying 72 standard sizes, to Specification EN6, in stock, for immediate delivery from Halesowen or East Kilbride. Our brochure, E-370, contains all details.

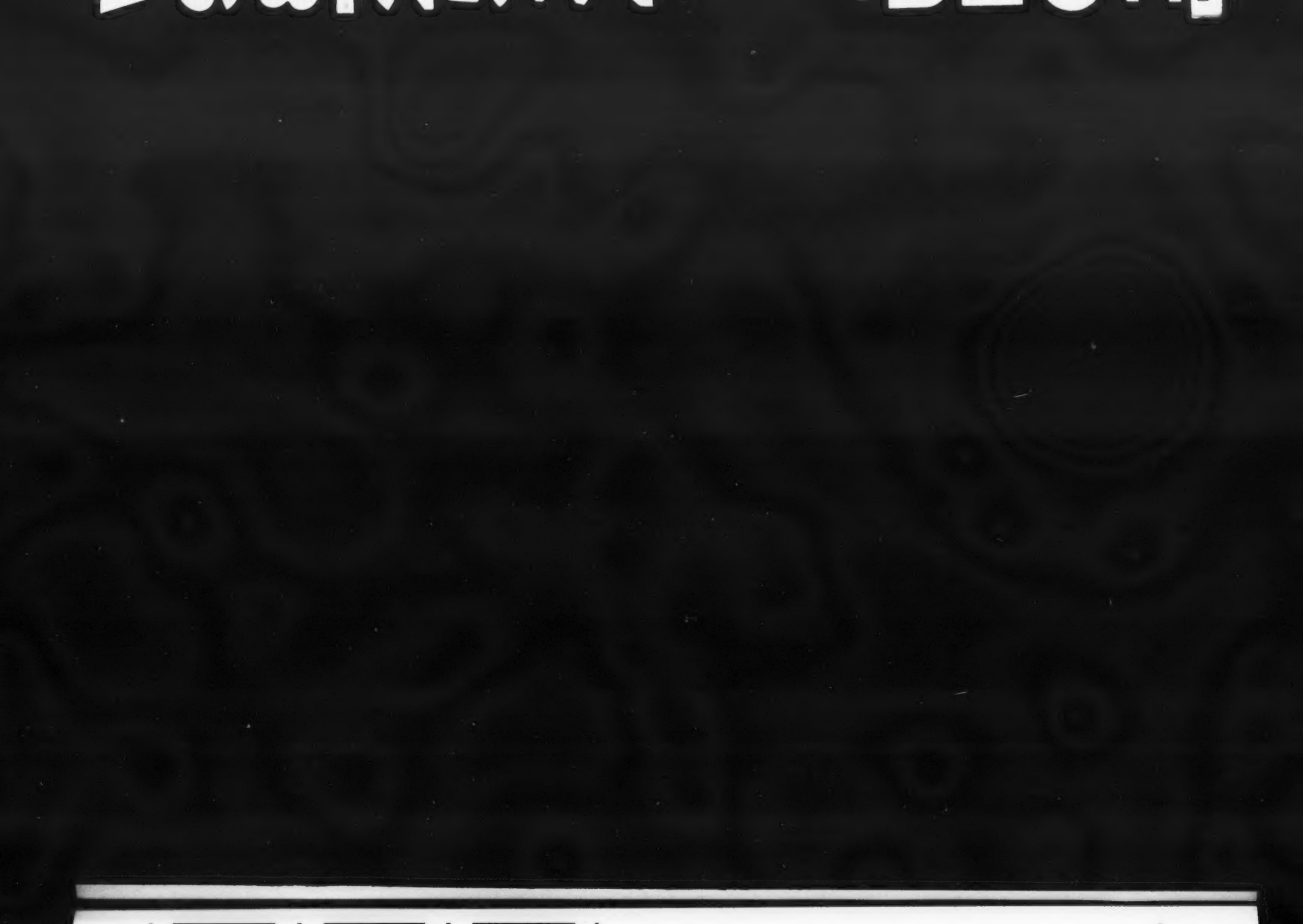
SANDVIK

SANDVIK SWEDISH STEELS LTD.

Manor Lane, Halesowen, Birmingham
Telephone: Halesowen 2121 (7 lines) Telex 33164

Scottish Warehouse at

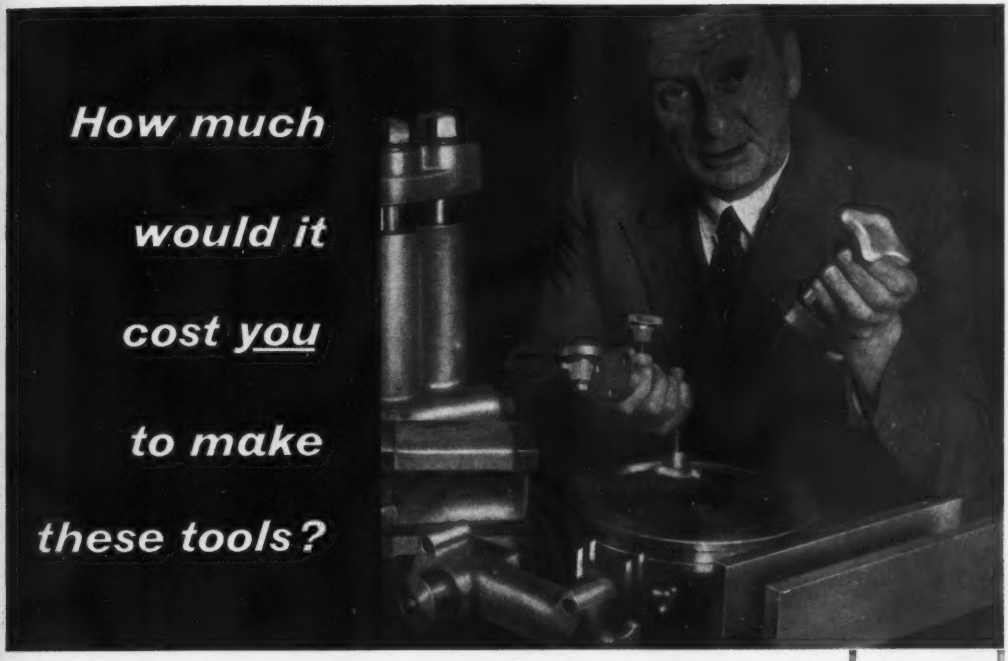
Blackbraes Road, Nerston Industrial Area,
East Kilbride, Glasgow Telephone: Murray 429



June

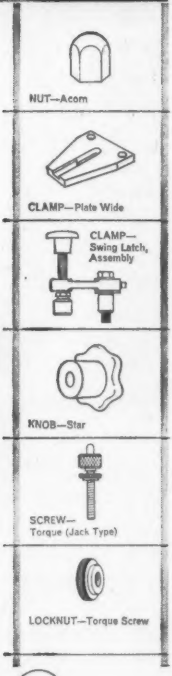
TH

WOO



...WE CAN SUPPLY THEM AT A FRACTION OF THE COST—within days!

Did you know that many of the jigs and tools prepared at great expense by your most skilled men can be assembled from high quality standard components supplied by Woodside? The fast-growing range already includes 30 basic tooling accessories in 300 individual forms, each available in numerous sizes. In today's competitive conditions, speed of re-tooling is often a decisive factor. Most WDS Tooling Aids are immediately obtainable from stock. The remainder can be supplied within days.



Tool up the Woodside way

SEND FOR THIS CATALOGUE OF TOOLING AIDS ▶

A glance through the list of standard items in the WDS Tooling Aids catalogue will show how you can cut costs and save time in the drawing office and at the bench.

THESE FIRMS FIND IT PAYS TO USE WDS TOOLING AIDS:
Handley Page (Reading) Limited, Humber Limited, Jaguar Cars Limited, Morphy-Richards (Cray) Limited, A. A. Jones and Shipman Limited, The National Cash Register Company (Manufacturing) Limited, Peto Scott Electrical Instruments Limited, The Pyrene Company Limited, Simplex Electric Company Limited, Westland Aircraft Limited.

THE BRITISH OXYGEN COMPANY LIMITED

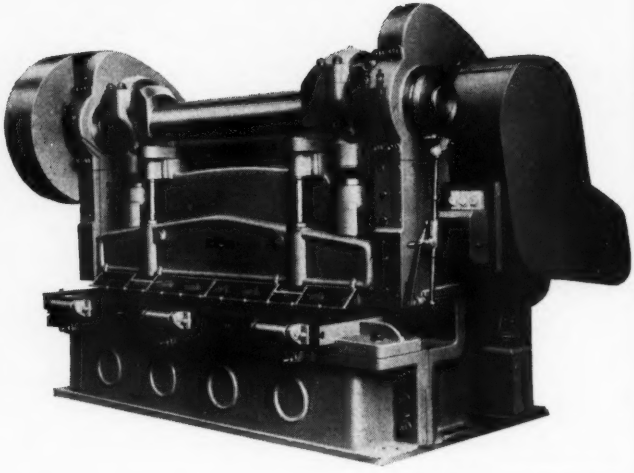
WOODSIDE WORKS, NEWLAY, LEEDS 13. Tel: Horsforth 4251/5. Telegrams: Wooddie Leeds, Telex 55185 TGA WOIS

When answering advertisements kindly mention MACHINERY.

F

NEW HEAVY PLATE MACHINES EX LONDON STOCK

This is an exceptional offer of two very fine machines which can be inspected at The FJE Machine Centre in London.



The guillotine is illustrated

⅜in. capacity **GUILLOTINE** with a cutting width of 8ft. 4⅜in. Complete with hold-down and calibrated rack and pinion adjusted back gauge.

200 tons **PRESS BRAKE** with a forming capacity in mild steel of ¼in. by 13ft. 11in. over a 2in. vee die opening, or ½in. by 65in. over a die opening of 4in. All-steel construction.

Both machines are motorised for 415 volts, 3 phase, 50 cycles supply.

Fuller details are available on illustrated specification sheets; please ask for copies.

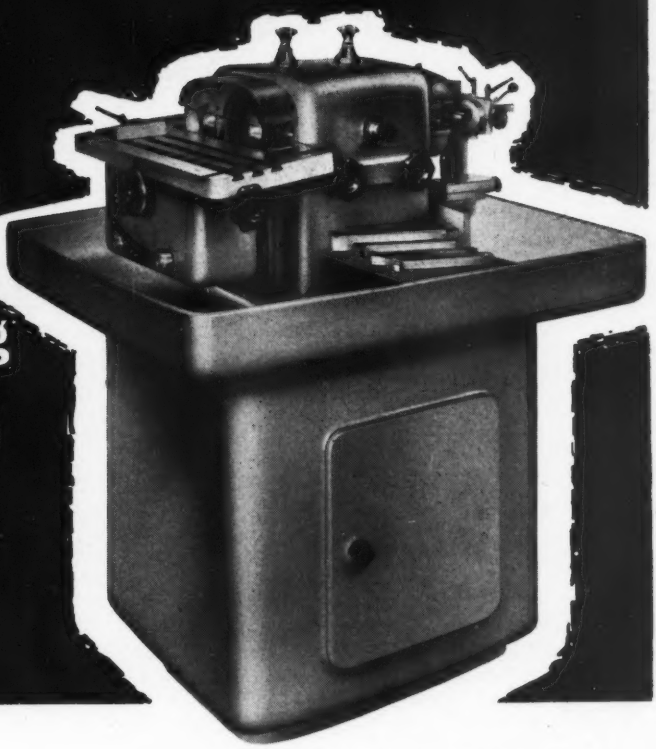
F.J. Edwards Ltd

EDWARDS HOUSE, 359-361 EUSTON ROAD, LONDON, N.W.1
Telephones: EUSton 5000 Telegrams: Bescotools London NW1
Telex: 24264 A/B Bescotools Ldn
Lansdowne House, 41 Water Street, Birmingham 3
Telephones: CENtral 7606-8 Telegrams: Bescotools Birmingham 3

LUSCHER

Made in the finest tradition of Swiss craftsmanship . . .

4 wheel combination carbide tool grinding and lapping machine



Specification

To take grinding & Lapping Wheels.	6in. dia.
Power of main motor.	1 h.p.
Size of inclinable table.	24in. by 9¾in.

Attachments Available. for Chip Breaker groove grinding, Nose radius grinding, twist drill grinding. Also oversize Table, Grinding Wheels, Lapping Wheels, Lighting equipment.

Basic price £395 Special Terms for Members of B.A.M.T.M.

HERBERT WIDDOWSON & SONS LIMITED

Canal Street Works Nottingham

Tel: 51891 (3 lines) Grams: TOOLS NOTTINGHAM

When answering advertisements kindly mention MACHINERY.

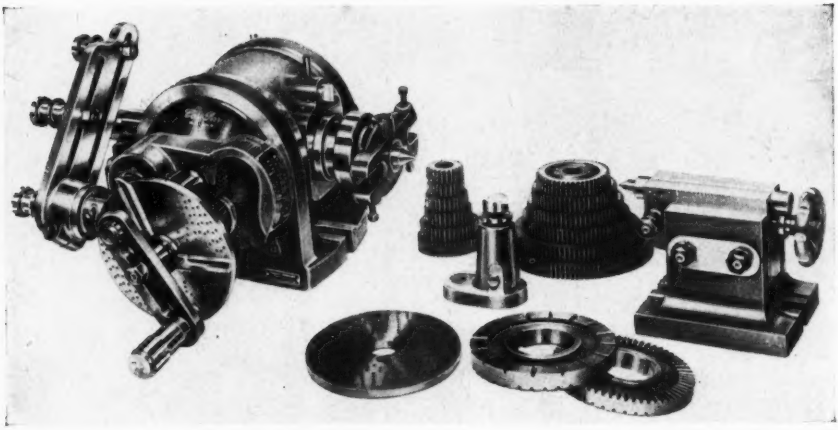
F2

COS·PAR

HIGH PRECISION

UNIVERSAL DIVIDING HEADS

MODEL ALFA



SPECIFICATION	ALFA 1	ALFA 2	ALFA 4	ALFA 5	ALFA 7	ALFA 9
HEIGHT OF CENTRES	4¼"	5¼"	5⅞"	6¼"	7"	7⅛"
BORE OF HOLLOW SPINDLE	⅝"	1⅛"	1⅛"	1⅛"	1⅛"	1⅛"
MORSE TAPER IN SPINDLE	No. 3	No. 4	No. 4	No. 4	No. 4	No. 4
MORSE TAPER IN TAILSTOCK... ...	No. 1	No. 2	No. 2	No. 2	No. 2	No. 2
DIVISION RATIO	1 : 40	1 : 40	1 : 40	1 : 40	1 : 40	1 : 40
DIVISIONS OBTAINABLE...	2-400	2-400	2-400	2-400	2-400	2-400
APPROXIMATE WEIGHT...	114 lbs.	161 lbs.	255 lbs.	260 lbs.	270 lbs.	280 lbs.
PRICE	£160	£180	£250	£275	£295	£310

SPECIAL TERMS TO MEMBERS OF B.A.M.T.M.

HERBERT WIDDOWSON & SONS LIMITED
CANAL STREET WORKS NOTTINGHAM
TELEPHONE: 51891 (3 lines) TELEGRAMS: TOOLS NOTTINGHAM

Superb performance
Attractive price
Quick delivery

All models complete with Standard Equipment including :

- Cos-par Universal Dividing Head
- Vertical Milling Attachment
- Arbor
- Front Support Braces

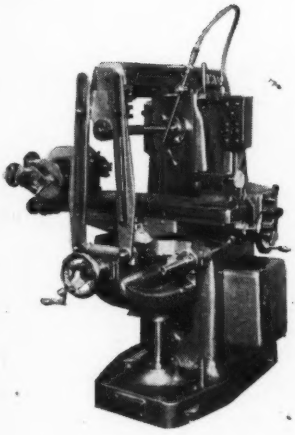
Specification :

	0	1	2
Table	34″ × 8¼″	39⅜″ × 9″	48″ × 11″
Long. Trav.	20″	26″	29″
12 Speeds	32-1000	60-1200	40-2000
Spindle Nose	No. 40	No. 40	No. 40
PRICE ★	£880	£1100	£1825

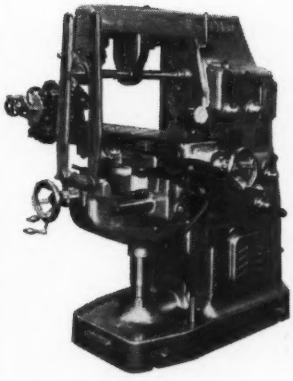
TEST

UNIVERSAL MILLING MACHINES

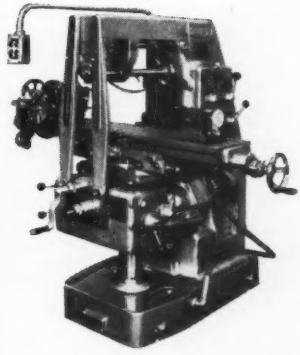
Model 0



Model 1



Model 2



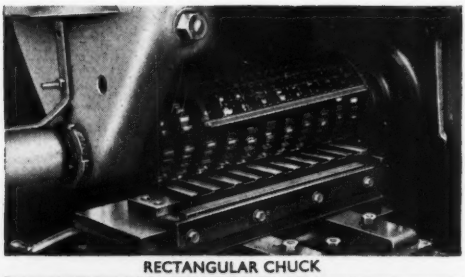
★ Special terms for members of B.A.M.T.M.

HERBERT WIDDOWSON & SONS LIMITED

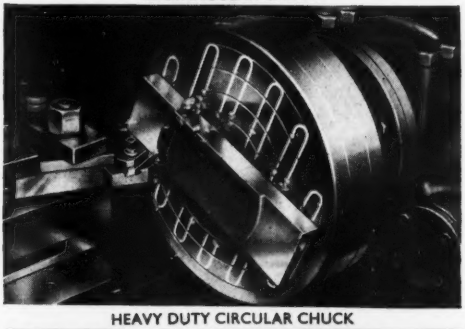
Canal Street Works, Nottingham. Tel : 51891 (4 lines) Grams : TOOLS, NOTTINGHAM

Eclipse

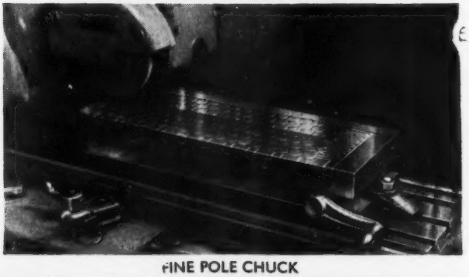
offers the most complete magnetic work holding service



RECTANGULAR CHUCK



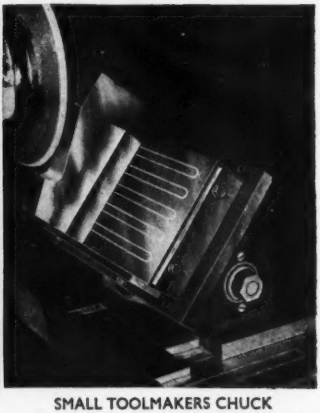
HEAVY DUTY CIRCULAR CHUCK



FINE POLE CHUCK

MINOR CHUCK

MAGNETIC VEE BLOCK



SMALL TOOLMAKERS CHUCK MOUNTED ON SWIVELLING BRACKET

Ask for detailed literature

Made by James Neill & Co. (Sheffield) Ltd. and available through your usual 'Eclipse' dealer

PM 156

THE

ASHCOMBE

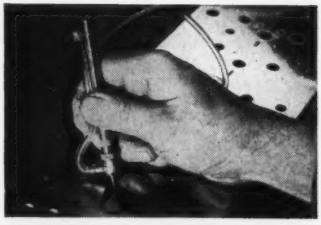
INDUSTRIAL

AIROTOR

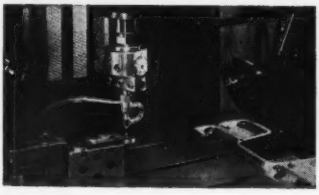
is here!

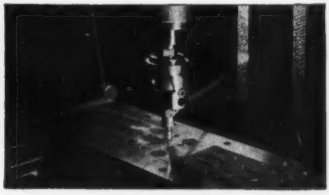
300,000 RPM

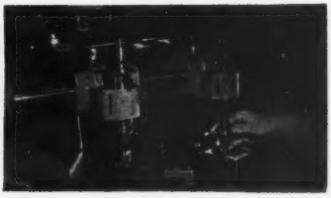
A revolutionary industrial tool for ultra high speed removal of metal and other materials to precision tolerances.



The Ashcombe Airotor is an air-driven instrument operating at a spindle speed in excess of 300,000 r.p.m. This speed develops the full efficiency of small carbide burrs in a field never before used or known. It is possible now to machine the very hardest tool steels, carbides, ceramics, chrome, glass, plastics etc. to close tolerances using inexpensive carbide, diamond and abrasive tools. The high operating speed dissipates all heat from the instrument and from the material being worked, and there is no tendency for the burr to 'climb'. The Ashcombe Airotor can be used as a hand tool, or easily adapted for use with Jigborers, Lathes, Milling Machines, Pantographs or in special 'set-ups'. The Airotor head itself is only $\frac{3}{8}$" diameter and $\frac{1}{2}$" long, allowing the instrument to reach into confined spaces and openings. A full range of tungsten carbide burrs and diamond mounted points are available for use with the Ashcombe Airotor, which can be operated from an airline providing a pressure of 40 lbs. p.s.i.







W. J. MEDDINGS LIMITED

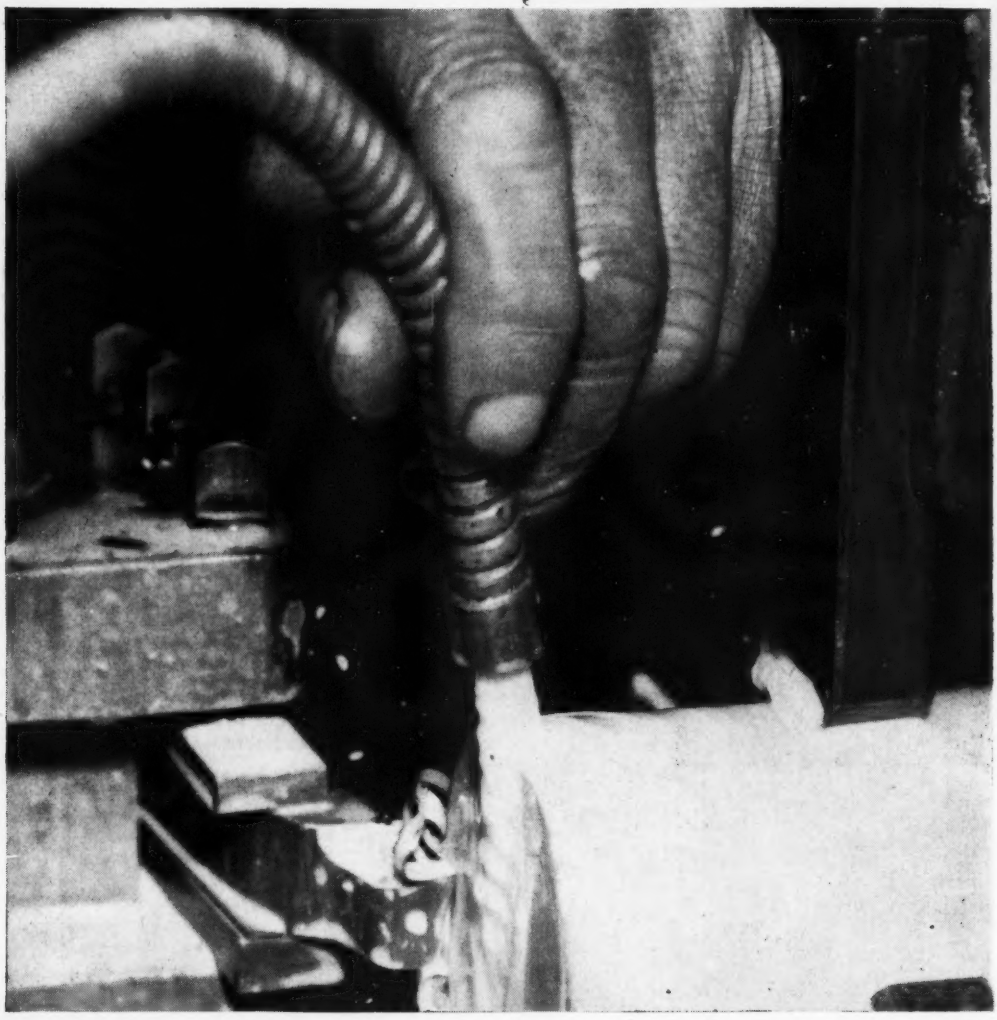
SPECIAL PURPOSE DIVISION

IPSWICH ROAD · TRADING ESTATE · SLOUGH · BUCKS

Phone: Slough 26761 (5 lines)

Sole selling agents in Europe

Shell achievement



One of Shell's recent achievements in Industrial Lubrication has been to reduce the risk of skin trouble for machine operators. Until the new Shell Dromus range, most modern soluble cutting oils contained phenolic compounds, which can cause skin irritation. They were used as coupling agents between the actual oil and the emulsifier. On high-speed machines, especially, the water evaporates and the emulsion concentrates. And that's when the trouble can start. Shell scientists found a better coupling agent, and made it work. And now, at no extra cost, management can reduce working risks for their staff. *Write for the book, 'Selecting Your Cutting Oils', to Shell-Mex House, London.*

SHELL

SHELL INDUSTRIAL OILS

Shell demonstration

Two clean, bright pennies are placed in beakers of oil, of equal performance level, one Shell Garia Oil 21, the other a conventional cutting oil containing sulphurised additives. After three hours at room temperature one penny is still bright and stain-free, the other heavily stained with black copper sulphide. The bright penny is from the beaker containing Shell Garia Oil 21, the blackened one from that containing the conventional oil. While these were just pennies they could have been bronze bushes in your machine tools—stained in less than half a shift. Sulphur is essential in heavy-duty cutting oils. Special additives in Shell Cutting Oils protect your machine tools and yet allow the sulphur to do its job.

Write for the book "Selecting Your Cutting Oils" to Lubricants Department, Shell-Mex House, London, W.C.2.

DROMUS . . . PELLA . . . MACRON . . . GARIA

SHELL

SHELL CUTTING OILS

When answering advertisements kindly mention MACHINERY.

for high speeds and light duty —

CORONA

Sensitive
DRILLING MACHINES

TYPE 1AX
12 in. SENSITIVE
CAPACITY UP TO ¼ in.—SPEEDS UP TO 3,000 R.P.M.
Available are bench and column models in single or multiple form, with from 1 to 6 spindles. Column to spindle centre 6½ in. Vertical adjustment of sliding head 6in. . . of table 22 in. Maximum spindle to table 33 in.

TYPE 2AX
BENCH OR FLOOR MODELS
CAPACITY UP TO ⅜ in.—SPEEDS UP TO 1,200 R.P.M.
A 13 in. sliding head machine in bench or floor types. Bench models available with from 1 to 6 spindles. Column to spindle centre 6½ in. Vertical adjustment of sliding head 8 in. Maximum distance spindle to table 39 in.

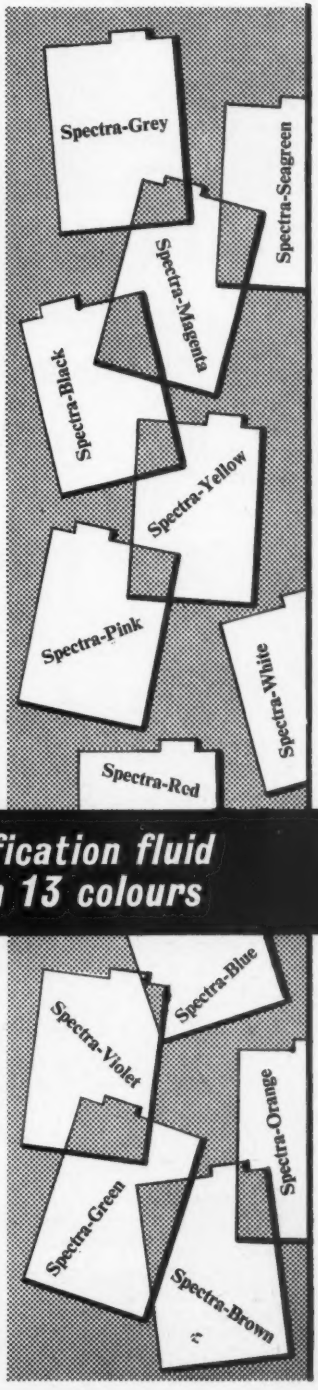
N.B.—On both types guard is spring loaded for easy belt change, and is not removable.

▲ TYPE 1AX

◀ TYPE 2AX

FREDK POLLARD & CO LTD
CORONA WORKS, LEICESTER, ENGLAND TELEPHONE: LEICESTER 67534 (5 lines)
London Office: COASTAL CHAMBERS, 15 ELIZABETH ST., BUCKINGHAM PALACE RD., S.W.1. TEL: SLOANE 8880
Scottish Representatives: WALTER S. LANG & CO., 48 OSWALD STREET, GLASGOW, C.1. Tel: CENTRAL 2539
North East: HODSON MACHINE TOOLS LTD. 150 NEW BRIDGE STREET, NEWCASTLE-UPON-TYNE

Spectra-Color



The only layout and identification fluid in 2 Grades—with each in 13 colours

SPECTRA AIDS TO INDUSTRY

In the machine shop, tool room, sheet metal shop and in the stores Spectra-Color provides accuracy, permanence and speed! With Spectra-Color you get needle-sharp layouts which will not smudge, chip, crack or peel, but are there until machined off or removed with Spectra-Remover. Spectra-Color dries instantly in a film only .0002in. thick and is unaffected by oil, petrol or water. In Standard Grade for all bright metals, Opaque for black metals and unmachined castings—both grades in 13 colours!

SPECTRA CHEMICALS LIMITED

Spectra Works, High Street, Caterham, Surrey.
Telephone: Caterham 3182 & 2293

MACHINE TOOL DIRECTORY

AUTOMATICS
MANURHIN Single Spindle machines. Manuf. De Machines Du Haut-Rhin France.....Sotama S.A., Switzerland
NASSOVIA-LINSTEDT Vert. Rotary Chuck Autos. and Univ. Drum Autos.
NASSOVIA Werkzeugmaschinenfabrik G.m.b.H. Germany.
Single spindle Automatics.
WARNER SWASEY ASQUITH LTD. Halifax
Single spindle and multi-spindle Bar and Chucking Autos.
WARNER & SWASEY.....U.S.A.

BALANCING MACHINES
DY-NAMIC machines.
BEAR Manufacturing Co.....U.S.A.

BORING MACHINES, Fine
Single and Multi-spindle machines.
Ernst KRAUSE & Co.....Austria

BORING MACHINES Horizontal, Floor
Traversing Column machines with spindle diameters up to 10 in.
William ASQUITH Ltd.....Halifax

BORING MACHINES Horizontal Table Type
William ASQUITH Ltd.....Halifax

BROACHING MACHINES
HI-TON Machine Tools Ltd., Birmingham

CENTRING AND FACING MACHINE
HI-TON Machine Tools Ltd., Birmingham

DIE SINKING MACHINES
NASSOVIA Werkzeugmaschinenfabrik G.m.b.H. Germany.

DRILLING MACHINES Radial, Vertical and Multi-Spindle
Wide range of size and capacities.
William ASQUITH Ltd.....Halifax

GEAR HOBBING MACHINES
DRUMMOND Bros. Ltd.....Guildford
GOULD & EBERHARDT.....U.S.A.

GEAR SHAPING MACHINES
MAXICUT machines for high speed and heavy duty.
DRUMMOND Bros. Ltd.....Guildford

GEAR TESTING MACHINES
WADTOOL Production testers.
WADDINGTON TOOLS Ltd. Wolverhampton

GRINDERS, Projection Form
PETEWE .....Germany

GRINDING MACHINES Centreless
LIDKOPING .....Sweden

GRINDING MACHINES Cylindrical and Universal
Also Crankshaft and Thread Grinders.
MSO Werke.....Germany

GRINDING MACHINES Internal
U.V.A. .....Sweden

SURFACE GRINDING MACHINES
SNOW & Co. Ltd.....Sheffield

HONING MACHINES
GEHRING G.m.b.H.....Germany

INDUSTRIAL WASHING MACHINES
For every need from bolts to buses.
DAWSON Bros. Ltd.....Leeds

JIG BORING MACHINES
MSO Werke.....Germany

KEYSEATING MACHINES
Oswald FORST G.m.b.H.....Germany

LATHES, Centre
George SWIFT & Sons Ltd.....Halifax
COLCHESTER Lathe Co. Ltd....Colchester
H.E.B. .....France

LATHES, Copying
MAXIPILOT Hydraulic high-production machines.
DRUMMOND Bros. Ltd.....Guildford
H.E.B. Universal Copying Lathes.
H.E.B. .....France

LATHES, Heavy Duty
George SWIFT & Sons Ltd.....Halifax
DEUTSCHLAND G.m.b.H.....Germany

LATHES, Multi-Tool
MAXICUT Automatic High-Production machines.
DRUMMOND Bros. Ltd.....Guildford

LATHES, Roll Turning
George SWIFT & Sons Ltd.....Halifax
DEUTSCHLAND G.m.b.H.....Germany

LATHES Surfacing and Boring
George Swift & Sons Ltd.....Halifax

LATHES, Turret
Wide range for bar and chuck work.
WARNER & SWASEY.....U.S.A.

LATHES, Wheel
DEUTSCHLAND G.m.b.H.....Germany

MILLING MACHINES Horizontal and Vertical
Reinhard BOHLE K.G.....Germany

PLANING MACHINES
with oil-hydraulic table operations.
Adolf WALDRICH Coburg K.G., Germany

PRESSES, Hydraulic
HI-TON machines from 1 to 300 tons.
HI-TON Machine Tools Ltd., Birmingham

RIVETING MACHINES
HI-TON Machine Tools Ltd., Birmingham

SAWING MACHINES, Cold
Hydraulic high-production machines.
J. F. OHLER.....Germany

SAW SHARPENING MACHINES
J. F. OHLER.....Germany

SLOTTING MACHINES
Hydraulic heavy duty machines.
Adolf WALDRICH Coburg K.G., Germany

TAPPING UNITS
William ASQUITH Ltd.....Halifax

MATERIALS TESTING EQUIPMENT
Otto WOLPERT Werke G.m.b.H., Germany

THREAD CUTTING MACHINES
High Speed Thread Peeling Machines.
Adolf WALDRICH Coburg K.G., Germany

THREAD ROLLING MACHINES
PITCHMASTER for high tensile steel.
HI-TON Machine Tools Ltd., Birmingham

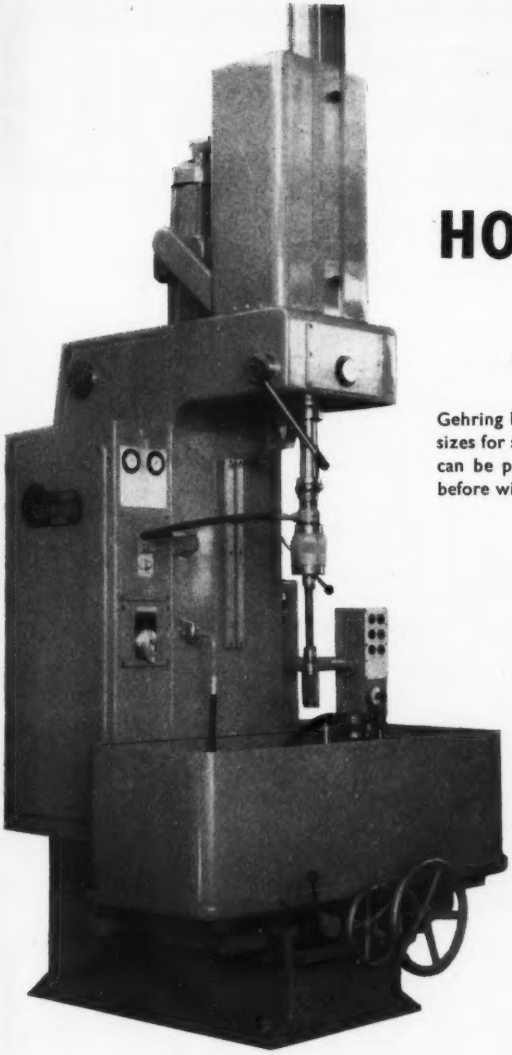
TRANSFER MACHINES
Complete installations for mass production needs.
William ASQUITH Ltd.....Halifax

TUBE BENDING MACHINES
STAFFA machines for quantity production.
CHAMBERLAIN INDUSTRIES Ltd., London

VERTICAL TURNING AND BORING MILLS
JUNGENTHAL .....Germany

Write today for further details on any of the above mentioned machines in which you are interested.

Sales and Service for the British Isles
DRUMMOND-ASQUITH LIMITED
Member of the Asquith Machine Tool Corporation
KING EDWARD HOUSE, NEW STREET, BIRMINGHAM Phone: Midland 3431 Also at LONDON Phone: Trafalgar 7224 and GLASGOW Phone: Central 0922

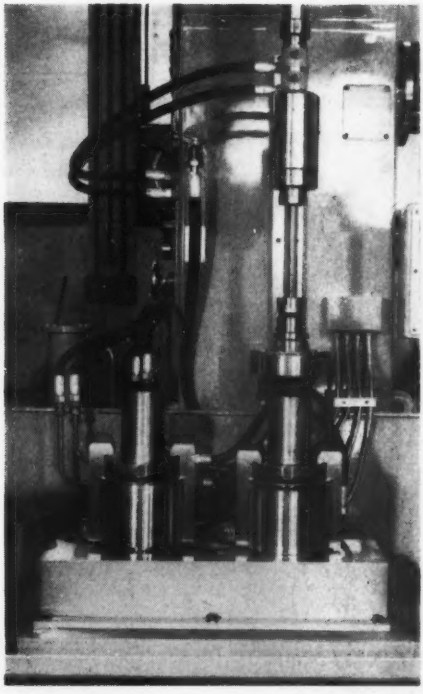


GEHRING

HONING MACHINES

for Internal and External Superfinishing

Gehring Honing Machines are available in a wide range of types and sizes for single and multiple spindle operation. Automatic sizing can be provided, whereby the hone retracts when size is reached before withdrawal from the bore.



Automatic Two Position Table

The illustration on the right shows an automatic two-position table with automatic liner clamping fixture. Rotary tables and transfer equipment for incorporation as part of a transfer line can also be provided.

Sales and Service for the British Isles

DRUMMOND-ASQUITH LIMITED

Member of the Asquith Machine Tool Corporation

KING EDWARD HOUSE, NEW ST., BIRMINGHAM *Phone: Midland 3431. Also at LONDON Phone: Trafalgar 7224 & GLASGOW Phone: Central 0922*

IF 430

When answering advertisements kindly mention MACHINERY.

INDUSTRY WELCOMES THE NEW TECALEMIT RIBBON FILTER ELEMENTS

Setting a fresh standard of high efficiency filtration for

AIR—WATER—PETROL DIESEL AND FUEL OILS | LUBRICATING, HYDRAULIC AND OTHER FLUIDS

Chosen for the famous FISHER Small Volume Regulators

Tecalemit Ribbon Filter Element is used in the series 67 combination Filter Regulator, manufactured by Fisher Governor Company Limited of Rochester. In such an application, the paper ribbon filter allows air to flow freely and provide adequate filtration, and water separation. A Tecalemit ribbon filter is sufficiently robust to withstand pressure drops well in excess of normal working conditions.

Tecalemit Ribbon Filter Elements

Simple construction—Low cost—High flow rate—Easy to clean

The elements are formed to resin impregnated cellulose ribbon, wound helically and electrically fused into an open-ended cylinder. Innumerable microscopic orifices between the ribbons allow a very high flow rate, while retaining impurities on the outside or inside surfaces, according to direction of flow.

The standard range of diameters (in any length) covers most applications and no other filtration material can so readily be adapted to individual requirements for filters, strainers, breathers or separators. Never before has such fine filtration been possible at such low cost and with such flexibility in use.

Tecalemit Ribbon Elements filter to maximum purity

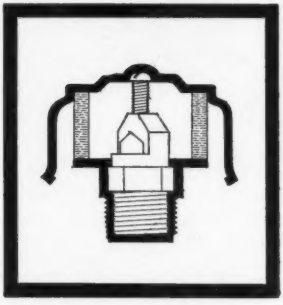
Tecalemit Air Breather Filters

(Incorporating Tecalemit Ribbon Filter Elements)

Cheapest—most efficient—cleanest to service Tecalemit Breathers act as ventilators to provide a free flow of clean air to hydraulic fluid, fuel and oil reservoirs. They give positive protection from airborne contamination to tanks, pumps, valves, cylinder and other engine components.

Of the standard types, two are breathers with screwed bodies, and the third is a combined clip-on assembly of breather and filter cap. All are fitted with Tecalemit Ribbon Filter Elements.

Tecalemit Breathers provide pure air cheaply and efficiently



TECALEMIT the authority on filtration

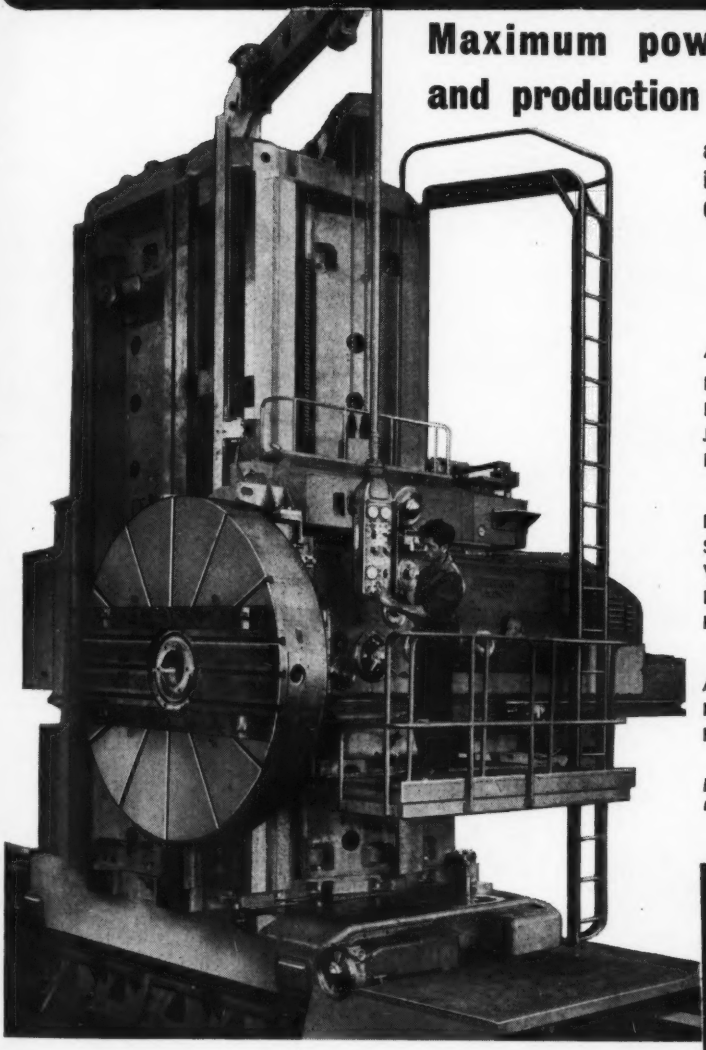
TECALEMIT LIMITED · (SALES M) · PLYMOUTH · DEVON

When answering advertisements kindly mention MACHINERY.

INNOCENTI

Maximum power, precision and production potential . . .

are essential characteristics of INNOCENTI—CWB Milling and Boring Machines



Additional important features :

- Maximum versatility
- Economical production
- Jig boring facilities
- Large diameter surfacing and boring at right angles to main spindle
- D.C. variable speed motors
- Sliding headstock
- Virtual elimination of boring bars
- Facilities for copying
- Facilities for automatic remote control electric measuring and for programme control
- All-electric—no electronics
- Minimum maintenance
- Remote pendant control of entire machine

Further information available on request.

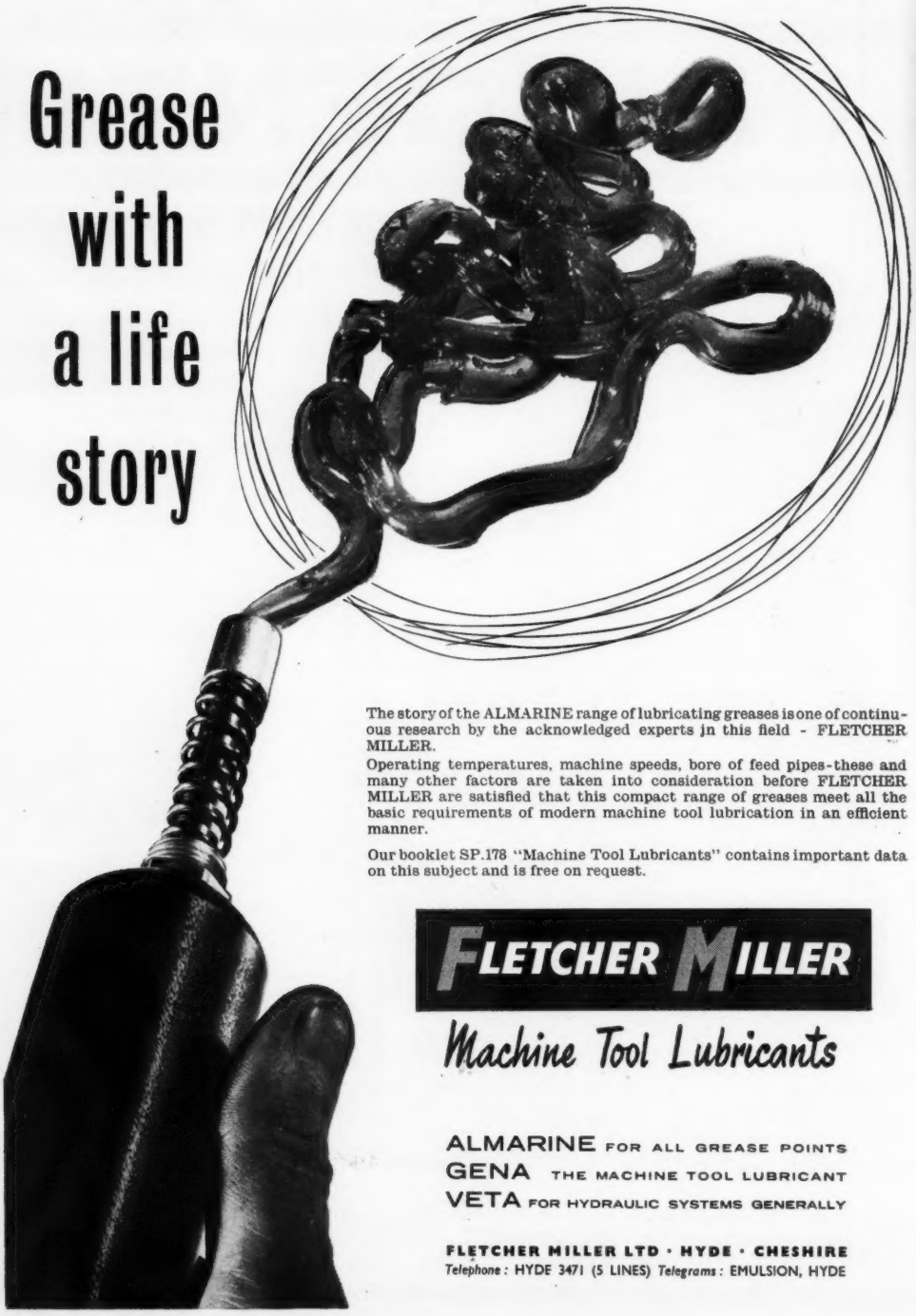
INNOCENTI—CWB floor type milling/boring machine FAF 305/200 equipped with removable facing head for large diameter surfacing/boring operations up to 14ft. diameter.

Inserted by Henderson & Keay Ltd., Agents in Great Britain for INNOCENTI Mechanical Division, Milan

HENDERSON & KEAY LTD. • 189 PITT STREET • GLASGOW, C.2

Phone: CENTRAL 0261

Grease with a life story



The story of the ALMARINE range of lubricating greases is one of continuous research by the acknowledged experts in this field - FLETCHER MILLER.

Operating temperatures, machine speeds, bore of feed pipes-these and many other factors are taken into consideration before FLETCHER MILLER are satisfied that this compact range of greases meet all the basic requirements of modern machine tool lubrication in an efficient manner.

Our booklet SP.178 "Machine Tool Lubricants" contains important data on this subject and is free on request.

FLETCHER MILLER

Machine Tool Lubricants

ALMARINE FOR ALL GREASE POINTS
GENA THE MACHINE TOOL LUBRICANT
VETA FOR HYDRAULIC SYSTEMS GENERALLY

FLETCHER MILLER LTD · HYDE · CHESHIRE
Telephone: HYDE 3471 (5 LINES) *Telegrams:* EMULSION, HYDE

44MTL

When men land on the moon they may find that there is an organisation up there producing gear cutting and finishing tools to standards hitherto undreamed of. Most engineers, realistic as ever, will settle for the certainty of the existence and quality of David Brown tools. So if you use Hobs, Shaper Cutters, Rack Cutters, and Shaving Cutters, the count-down is Huddersfield 3500 —and you're well away towards the heights of gear production!

DAVID BROWN

An alliance of engineering specialists in gearing, machine tools, tools, castings, automobiles, and agricultural tractors and machinery.

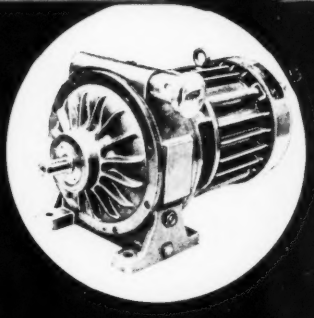
THE DAVID BROWN CORPORATION (SALES) LIMITED

TOOL DIVISION, PARK WORKS, HUDDERSFIELD. TELEPHONE: HUDDERSFIELD 3500

- Range 1/33 h.p. to 15 h.p.
- 9 to 1 stepless speed variation.
- Flange mounted motors (when required).
- Flange mounted Reduction Gears for low output speeds.
- Exceptionally light, sensitive, and accurate control of speed settings by handwheel, pneumatic, mechanical or electrical remote control.

Technical Representatives in
LONDON
BIRMINGHAM
MANCHESTER
LEEDS
BRISTOL
GLASGOW

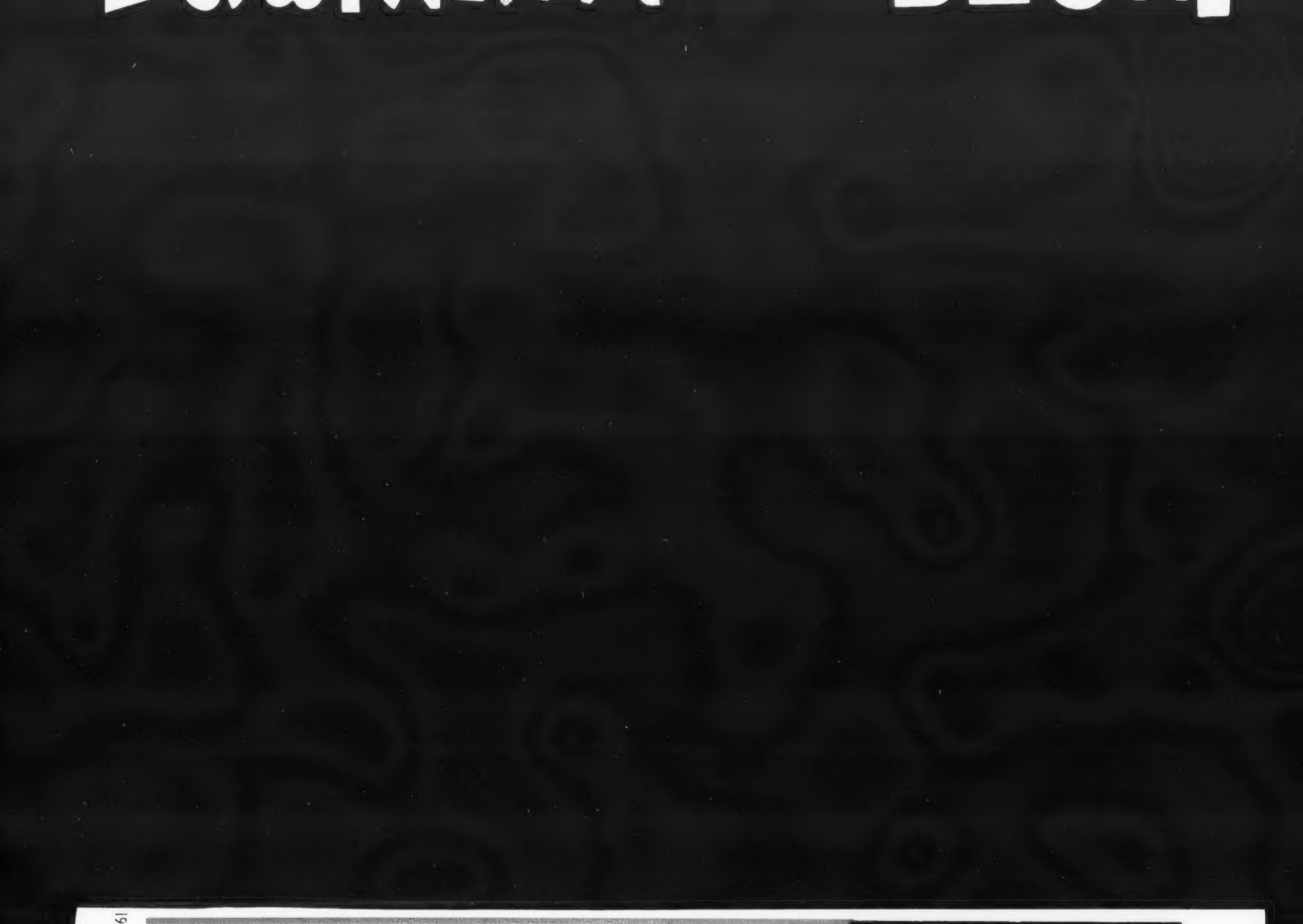
Kopp VARIATORS



CONTROLLED VARIABLE SPEED

ALLSPEEDS LIMITED

Royal Works · Clayton-le-Moors, P.O. Box 43, Accrington, Lancashire · Telephone Accrington 35441 (6 lines)



Fo

An
val
giv
pre
cat
is
the

For better service from any air line

Any air control system incorporating cylinders and valves, or which operates tools and equipment, will give better service if the air is properly filtered, the pressure is regulated to the job and adequate lubrication is provided. The Schrader LUB-AIR-ATOR is a combination of three units which perform these functions automatically, ensuring better and safer operation and longer, care-free service. It prevents wastage of high-pressure air and reduces frictional wear on installations and equipment. The LUB-AIR-ATOR is easily maintained. It has no moving parts to wear and can be serviced without disturbing the pipe connections. Available in three sizes with various flow capacities.

AIR LINE FILTERS
Clean the air supply of rust, dirt and moisture. Sintered bronze filter unit, whirling action baffle plate and bowl, easily cleaned without disturbing piping.

AIR PRESSURE REGULATORS
Reduce and maintain line pressures to the actual requirements at any point. Outstanding for higher capacity, faster response and lower pressure drop under loading.

AIR LINE LUBRICATORS
Provide lubrication protection for cylinders, valves and pneumatic equipment. External flow adjustment. Visible oil level. Refilled without shutting off the air.

Schrader

*Another product of Schrader design and workmanship.

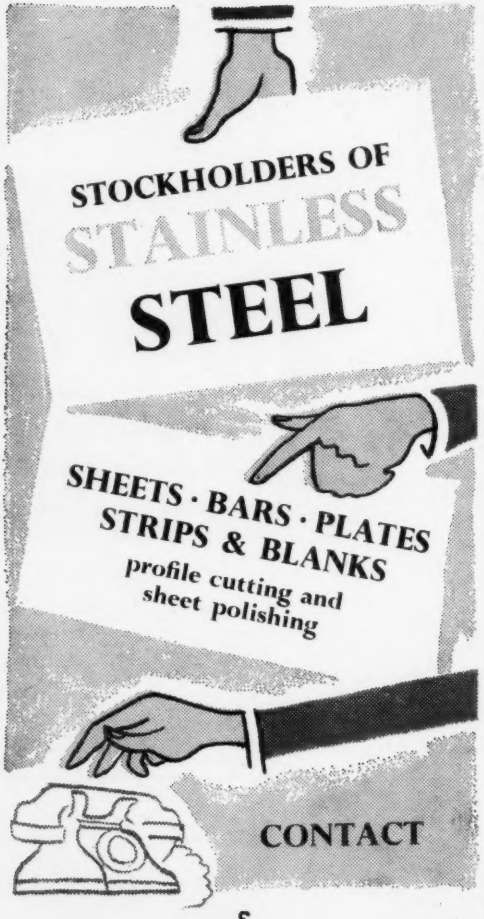
To: A. SCHRADER'S SON, Air Control Products Dept. M 829 TYBURN ROAD, ERDINGTON, BIRMINGHAM, 24

Please send details of Schrader LUB-AIR-ATOR

NAME.....

ADDRESS.....

251



COX AND DANKS LIMITED

PROFILE CUTTING TO ANY SHAPE

SCAPA HOUSE · PARK ROYAL RD.
LONDON N.W. 10

Tel: Elgar 5811 Telex 25239

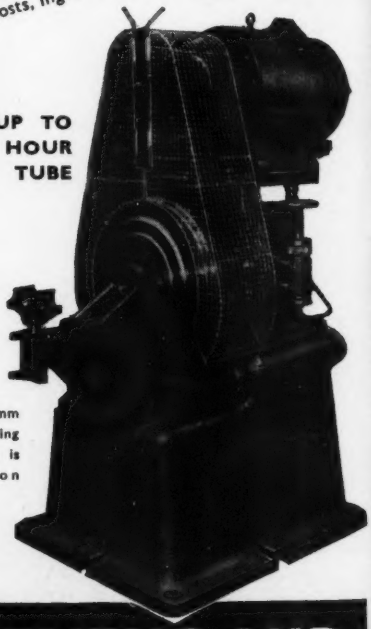
A METAL INDUSTRIES GROUP COMPANY

SS 13

INTRODUCING The S&B ROTARY COLD TAGGING MACHINE

Backed by 30 years' experience in building rotary swagers, the makers have designed this new machine especially for cold tagging steel and non-ferrous tube or bar. Four dies are mounted in a fixed head and do not rotate. THERE IS NO POSSIBILITY OF THE DIES REVOLVING THE TUBE risking injury to the operator. Advantages are a uniform strong tag, no heating and furnace costs, higher production.

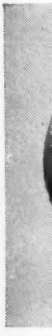
OUTPUT UP TO 200 PER HOUR ON 2in. TUBE



A short 16mm film describing this machine is available on application.

STEVENS AND BULLIVANT Ltd

WESTERN ROAD BIRMINGHAM 18 ENGLAND



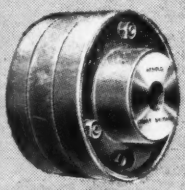
R

RENOLD
Power transmission accessories

When it's a question of

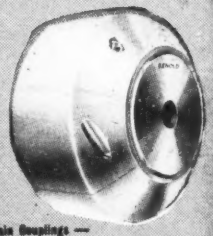
Spider Type Flexible Couplings — range of 8 couplings up to 30 h.p.

coupling one shaft to another . . .



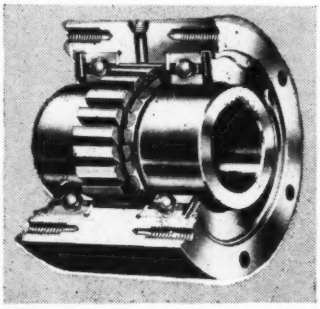
Disc Type Flexible Couplings — range of 16 couplings up to 600 h.p.

RENOLD couplings are the answer !



Chain Couplings — range of 11 couplings up to 1,500 h.p.

Sturdy and compact, Renold Couplings have for many years proved their value on a wide variety of applications — and they are AVAILABLE FROM STOCK. For complete information ask for Catalogue Ref. 116/118.



RENOLD SPRAG CLUTCHES
For Over-running, Indexing and Backstopping

The Renold Sprag Clutch has many uses in all types of machinery and is ideal for the replacement of noisy ratchet-and-pawl mechanisms. It will give completely positive indexing with speed, accuracy and to unlimited graduations, is capable of high speed free-wheeling, and will remain free from measurable backlash throughout its life.
Write to Renold Chains Limited, Sprag Clutch Unit, 50 Cathedral Road, Cardiff, for Catalogue giving details of our comprehensive range of over 70 standard sizes. Renold Chains Limited are licensed to manufacture Sprag Clutches by Formsprag Co., U.S.A.

RENOLD CHAINS LIMITED • MANCHESTER

RENOLD

When answering advertisements kindly mention MACHINERY.

NEW MILLING TOOLS!

HIGH-SPEED STEEL
SCREW SHANK
END MILLS
(WITH EXCLUSIVE TOOTH FORM)

HIGH-SPEED STEEL
SCREW SHANK
SLOT DRILLS
(WITH EXCLUSIVE TOOTH FORM)

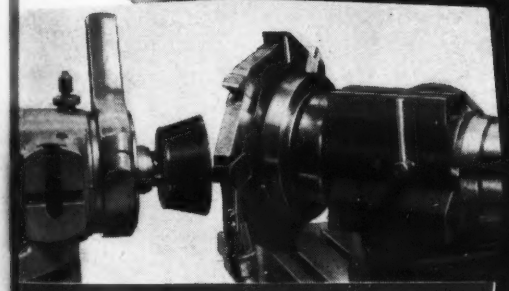
THE
TITANIC
CHUCK
(INCORPORATING MANY NEW DESIGN FEATURES)

OSBORN

The superior design of these products is the result of prolonged research and development. They are far in advance of similar tools of comparable price and much faster speeds and feeds are achieved with the cutters.
Please write for leaflet No. 11 *"An Advance in Milling"*.

☆ Comprehensive stocks constantly maintained

SAMUEL OSBORN & CO., LIMITED
CLYDE STEEL WORKS · SHEFFIELD
Fine Steelmakers · Steelfounders · Engineers' Toolmakers



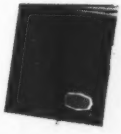
A NEW RANGE OFFERING FASTER CUTTING AND LONGER LIFE.

FOR CARBIDE TOOLS

The fast, free cutting action and superlative finish they produce have been the pre-eminent qualities of Spedia Diamond Wheels since they were originally patented in 1932.

Now, after long research into diamond composition, and bonding materials and methods a new grade of wheel has been evolved with substantially improved life.

The range is described in a new catalogue now available ; Super Spedia Resin Bond Diamond Wheels, free on request.



WICKMAN LIMITED

MANUFACTURERS OF DIAMOND WHEELS
SINCE 1932

P.O. BOX 54, COVENTRY
ENGLAND

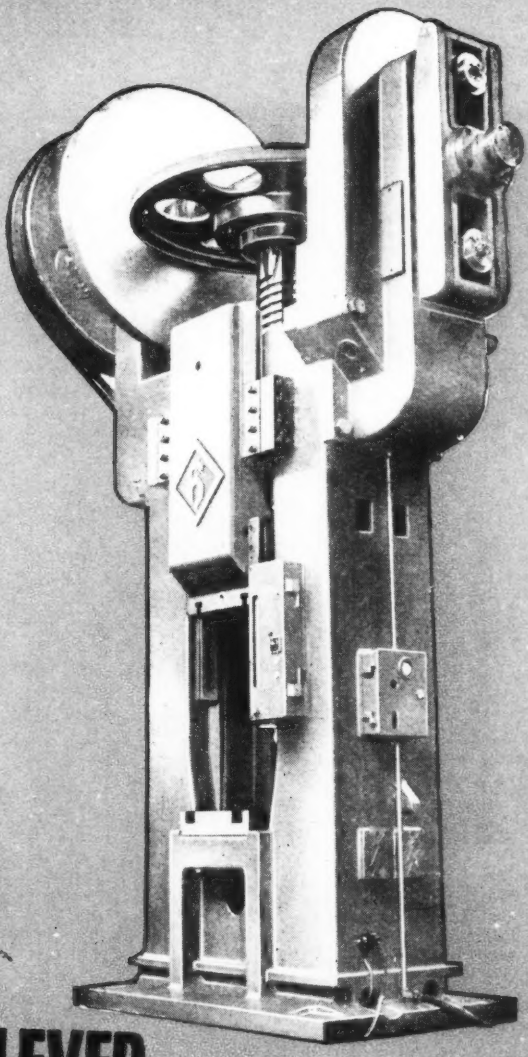
SPEDIA — your choice for Life !

ST

REMEMBER!

IT'S PAUL GRANBY

FOR—



HASENCLEVER
Friction Screw Presses
with electronic variable blow selector

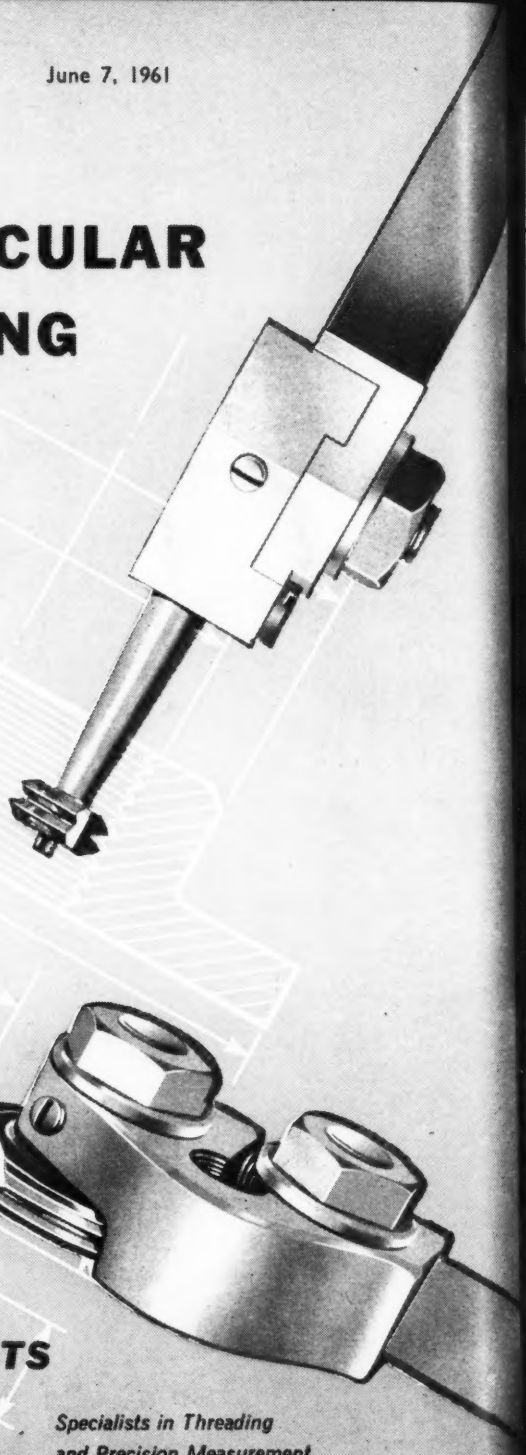
PG

PAUL GRANBY & CO. LTD.

39 VICTORIA STREET · WESTMINSTER · LONDON · S W 1

Telephone: ABBEY 5331 Telegrams: POWAFORGE, SOWEST, LONDON Cables: POWAFORGE, LONDON

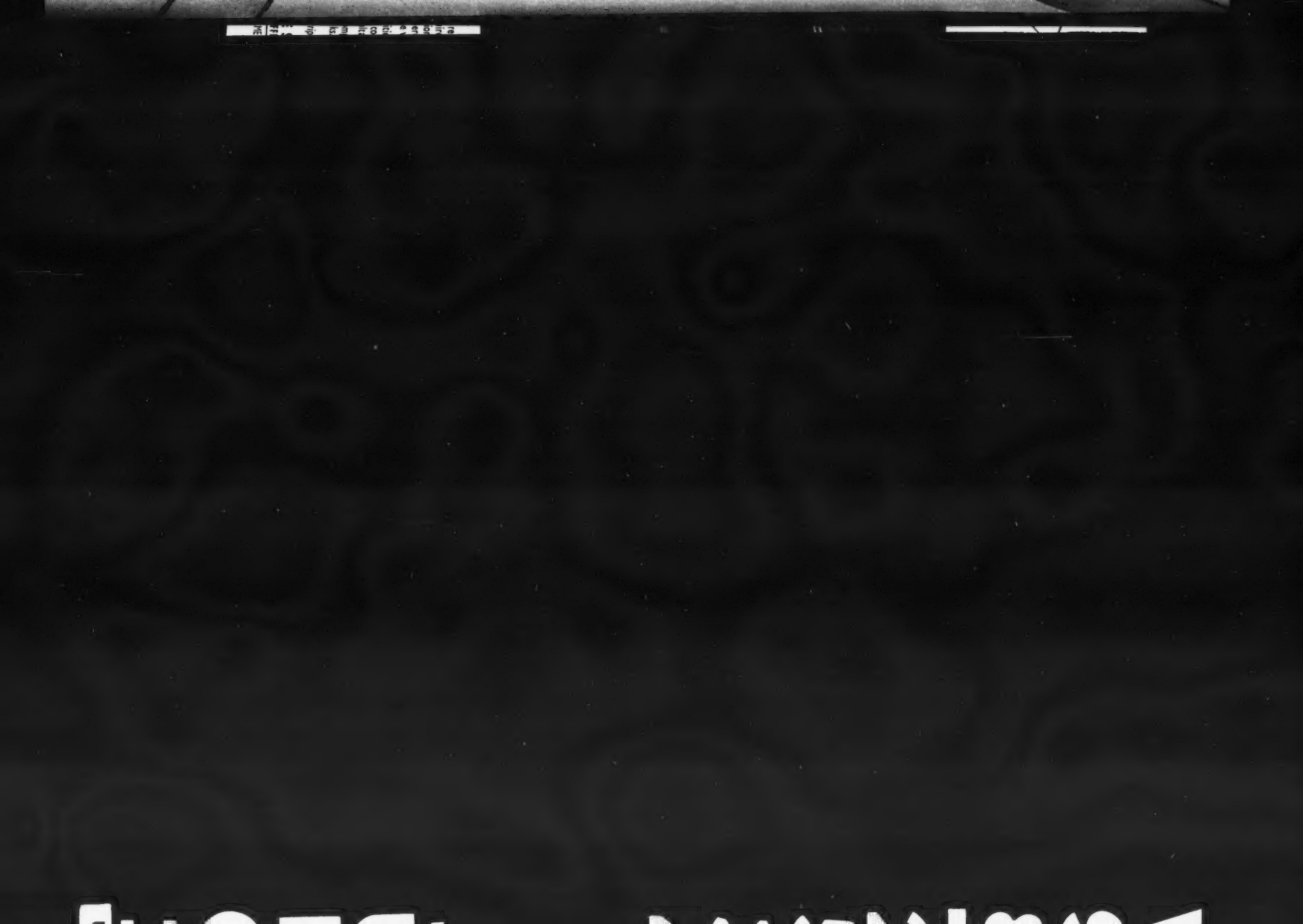
CEJ CIRCULAR THREAD CHASING TOOLS



LOW COST TOOLING FOR SHORT RUNS AND THE LARGER COMPONENTS

CEJOHANSSON LTD. *Specialists in Threading and Precision Measurement*

SOUTHFIELDS ROAD, DUNSTABLE, BEDS. TEL: DUNSTABLE 62422



repetitive d
uired, consid
ion Sleeve a
erous drills–
e with taper

itionally, this
conventional
ultaneously.

mprehensive
ks.

riptive brochu

SHEFFIE
FFIELD

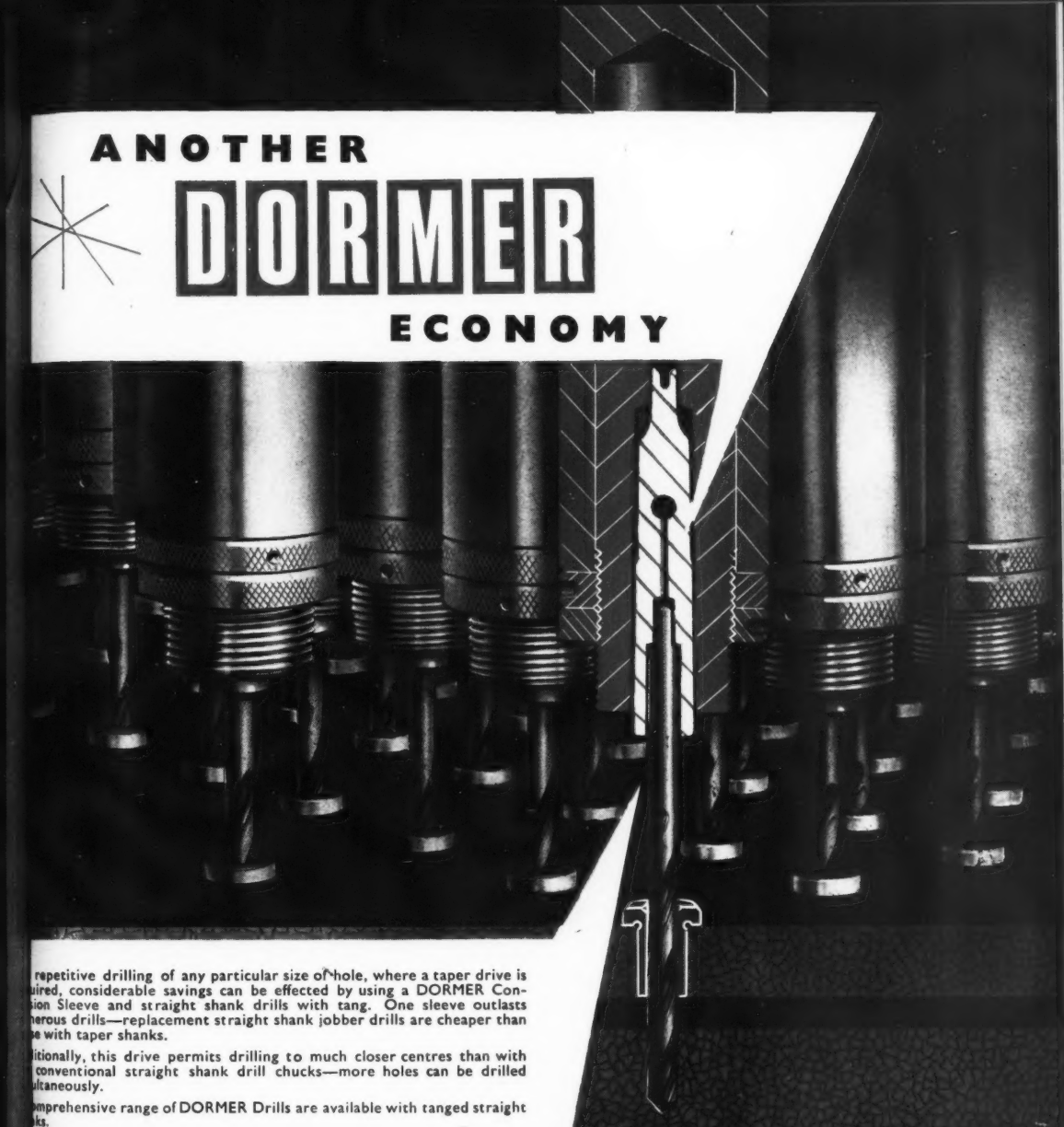
MER TOOLS

CO

ANOTHER

DORMER

ECONOMY



repetitive drilling of any particular size of hole, where a taper drive is uired, considerable savings can be effected by using a DORMER Con- sion Sleeve and straight shank drills with tang. One sleeve outlasts nerous drills—replacement straight shank jobber drills are cheaper than e with taper shanks.

itionally, this drive permits drilling to much closer centres than with conventional straight shank drill chucks—more holes can be drilled ultaneously.

mprehensive range of DORMER Drills are available with tanged straight ks.

criptive brochure available.

E SHEFFIELD TWIST DRILL AND STEEL COMPANY LIMITED
FFIELD ENGLAND

MER TOOLS ARE OBTAINABLE FROM YOUR USUAL ENGINEERS' MERCHANTS

CONVERSION SLEEVES AND TANGED STRAIGHT SHANK DRILLS

WARNER Electric Brakes and Clutches offer better-than-ever efficiency in machine control! Their design is a lot simpler than that of conventional means. Brake and clutch components operate by electro-magnetic engagement of two main parts—the disc shaped magnet and the armature; there is virtually no mechanical movement. Operation is very much more flexible, sensitive and incomparably faster.

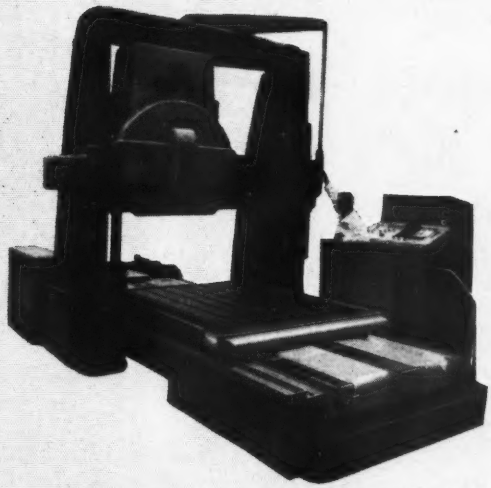
Warner Units offer—to increase production—

- *Elimination of complex equipment.*
- *Rapid engagement.*
- *Cushioned stopping and starting.*
- *Smooth tensioning, indexing.*
- *Fully locked in torque transmission.*
- *New possibilities in machine design.*

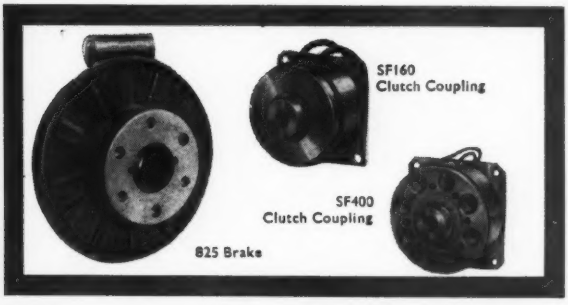
800% RISE IN SALES OF WARNER UNITS

When answering advertisements kindly mention MACHINERY.

Control of revolutions!



The quick response of Warner Clutches makes them eminently suitable for use in the positioning gearboxes of James Archdale's new "Autonomic" Vertical Co-ordinate Drilling Machine on which the drilling head and table are accurately positioned under automatic control.
(Photograph produced by courtesy of James Archdale & Co. Ltd., Worcester)



WARNER

Electric Brakes and Clutches

Write for illustrated brochure

WESTOOL LIMITED

ST. HELEN'S AUCKLAND, CO. DURHAM
Phone: West Auckland 551 (6 lines) Grams: Solenoid, West Auckland

London Office:
2 Ashley Place, Carlisle Place, London, S.W.1. Phone: VICtoria 7301/3
Birmingham Office:
Silhill House, 2241 Coventry Road, Sheldon, Birmingham, 26 Phone: SHEldon 5121/2

—OVER THE LAST 5 YEARS!

TIB 178

GOOD TEETH... *Effectiveness*

SPURS AND SPROCKETS

From $\frac{1}{8}$in. to 36in. diameter

From $\frac{1}{4}$in. to $\frac{3}{4}$in. Pitch

Maximum DP Spurs 5

Tooth Rounding (Spurs)

WEEKS AND WILSON LTD.

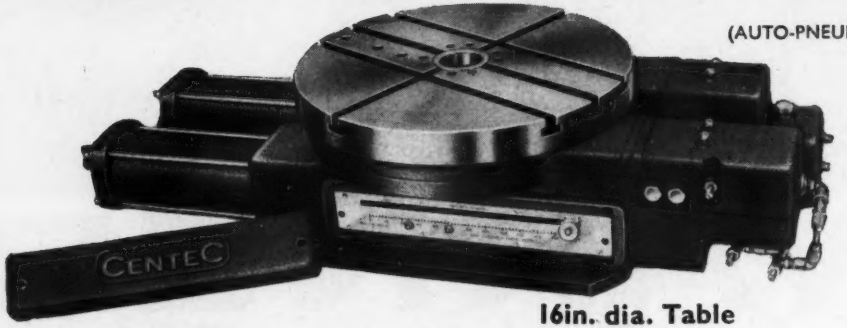
GEARS AND GEAR CUTTING

581, GREEN LANES, HARRINGAY, LONDON, N.8. TEL: FITZROY 0055-6

CENTEC INDEX TABLES

in various sizes for VERY FAST INDEXING

(AUTO-PNEUMATIC)



16in. dia. Table

- Angular Accuracy to a few seconds of an arc. *(N.P.L. Certificate)*
- Accuracy of repetition 0·000075in. at 20in. p.c.d.
- 60 different angles by positioning of Pointer in a Slot
- Self-locking after indexing
- Overriding Impossible due to positive engagement

For ROTARY TRANSFER—UNIT HEADS—SOLDERING/WELDING—ASSEMBLY, etc.

CENTEC MACHINE TOOLS LTD • CENTEC WORKS • HEMEL HEMPSTEAD • HERTS • *Boxmoor 584-5-6*

When answering advertisements kindly mention MACHINERY.

K E FORGINGS

In high speed, carbon and alloy tool steels, stainless, heat resisting and alloy steels.

Forging a K.E.965 special heat resisting steel exhaust valve for a marine engine.

Specialists in forging

**RINGS, DIE BLOCKS, GEAR BLANKS,
BOSSED FORGINGS, VALVES, ETC.
FROM HIGH GRADE SPECIAL STEELS.**

KAYSER ELLISON & CO. LTD

ESTABLISHED 1825

CARLISLE STEEL WORKS · SHEFFIELD 4

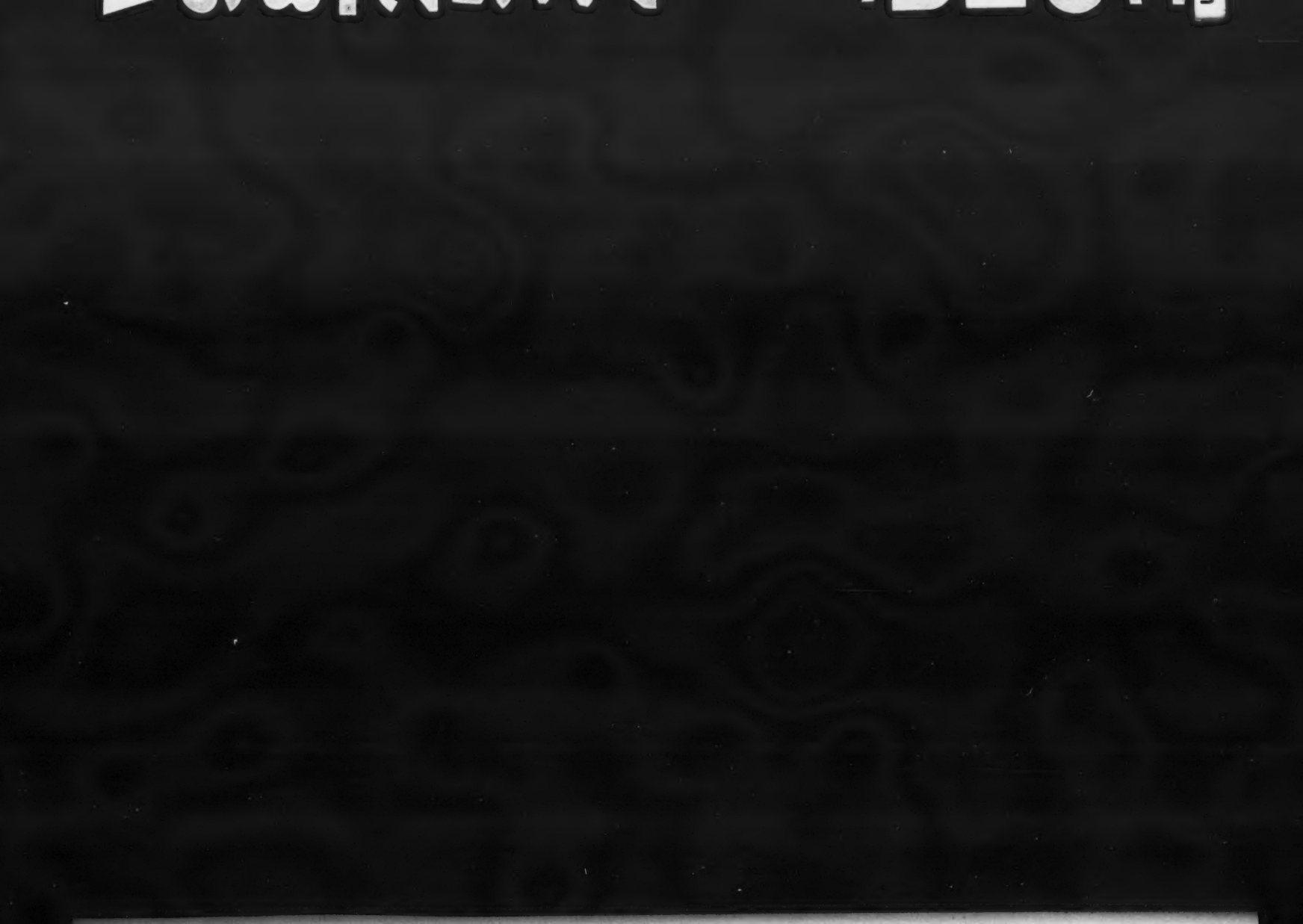
TELEPHONE: SHEFFIELD 22124 (6 lines) TELEGRAMS: KAYSER SHEFFIELD 4.

LONDON STOCK WAREHOUSE: 4 Pembridge Mews, Notting Hill Gate, W.11
Telephone: BAYswater 9131/2

MIDLAND STOCK WAREHOUSE: Station Road, Coleshill, Birmingham.
Telephone: Coleshill 2041/2

If you make or use...
TAPS · SCREWING DIES · BLANKING DIES
MILLING CUTTERS · THREAD MILLING HOBS
END MILLS · FORMING AND THREADING DIES
BROACHES · DRILLS · GAUGES, ETC.
SPECIFY
FMP
321 TAP DIE STEEL
AND ENSURE MAXIMUM AND UNIFORM PERFORMANCE
A Multi-purpose steel that has earned a high reputation for its non-shrinking and wear resisting properties. Easy to harden and dimensionally stable under heat treatment. Rounds from ¼in. to 4in. Squares ¼in. to 2in. Flats in a range of sizes. Also supplied in rings and forgings.
F·M·PARKIN (SHEFFIELD) LTD
ST. THOMAS STEEL WORKS, SHEFFIELD 8, ENGLAND
TELEPHONE: SHEFFIELD 50083 (5 lines). GRAMS: SORBITIC, SHEFFIELD 8
Red Lion Market, Whitecross Street, Finsbury, London, E.C.1 Telephone: Monarch 9182

When answering advertisements kindly mention MACHINERY.



pre
pro
fac

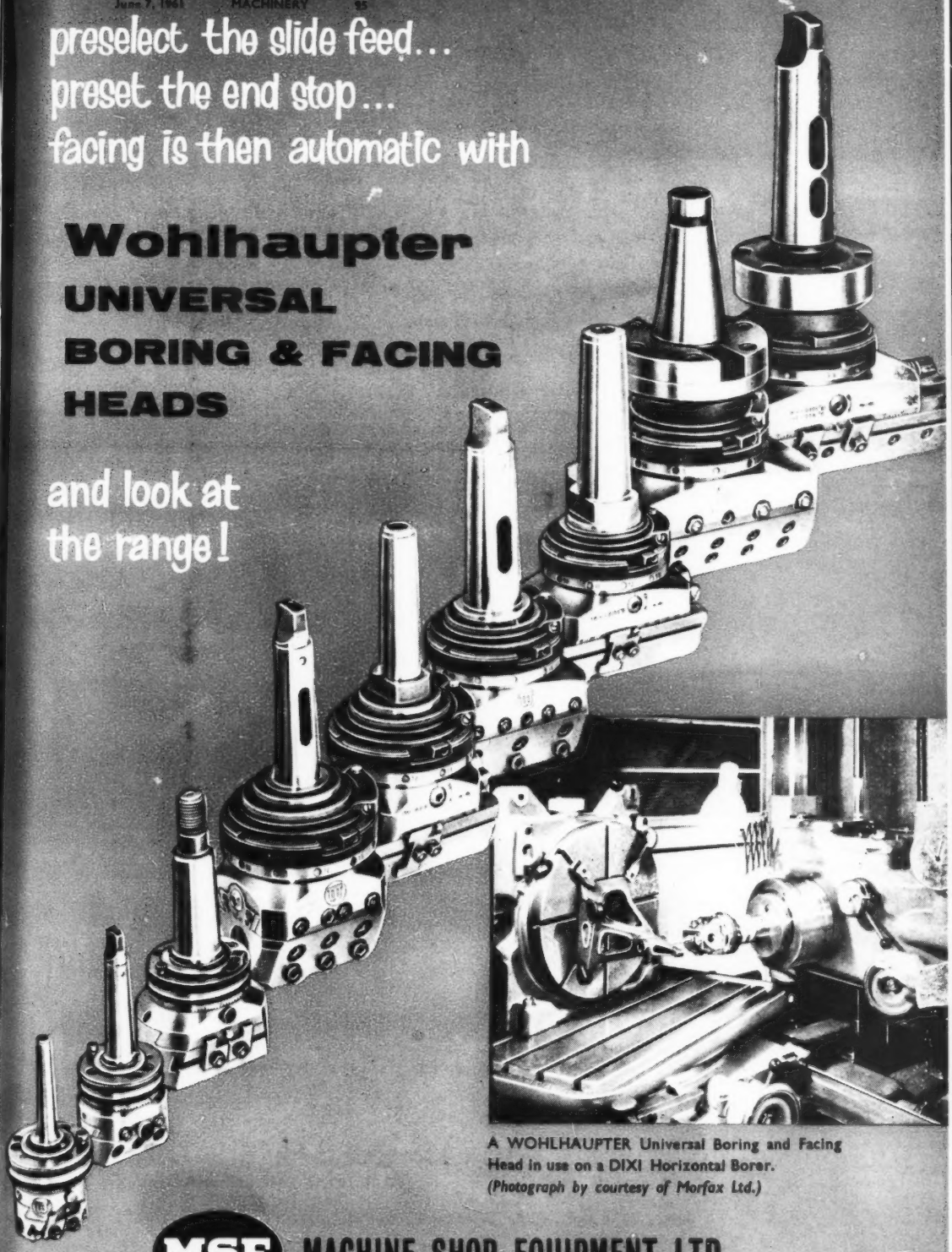
V
U
E
H

an
th

preselect the slide feed...
preset the end stop...
facing is then automatic with

Wohlhaupter
UNIVERSAL BORING & FACING HEADS

and look at the range!



A WOHLHAUPTER Universal Boring and Facing Head in use on a DIXI Horizontal Borer.
(Photograph by courtesy of Morfax Ltd.)

MSE MACHINE SHOP EQUIPMENT LTD.
Spenser Street, London S.W.1 Telephone: VICtoria 6086

"GLASTEC" IRON

AT A FRACTION OF THE COST OF OTHER METAL-BASE FILLERS . . . AND MOREOVER GIVES PERFECT ADHESION

- *CAN BE DRILLED, TAPPED & MACHINED*
- *SIMILAR TO CAST IRON*
- *PERMANENT, DURABLE, MOULDABLE*
- *A TIME AND MONEY SAVER ON THE FOUNDRY AND MACHINE SHOP*
- *EXCELLENT STORAGE LIFE UP TO 12 MONTHS UNDER NORMAL STORAGE CONDITIONS*

"GLASTEC" iron is a combination of specially prepared iron powder and liquid resin supplied in separate containers. The combination of these two ingredients provides an easily mouldable paste, which can, upon hardening, be drilled, tapped or machined. The standard mixture of iron powder and liquid resin allows for a setting time of 20/30 minutes. This setting time may be varied by increasing or decreasing the ratio of iron powder to liquid resin. Special packs with accelerated or retarded setting times available by arrangement.

for

JIGS, FIXTURES AND FORMING DIES TOO

"GLASTEC" iron, combined with glass fibre, can easily be fabricated into jigs, fixtures and forming dies. The process is simple and cheap and the finished product gives reasonably long life.

PRICE 7/6 lb.

AVAILABLE IN 6 lb. 12lb. & 24 lb. PACKS.
LARGER PACKS UP TO 1 cwt., AVAILABLE BY ARRANGEMENT

GLASS FIBRE FABRICATIONS LTD.
HADFIELD MILLS · HADFIELD
MANCHESTER
TELEPHONE : GLOSSOP 3112

B

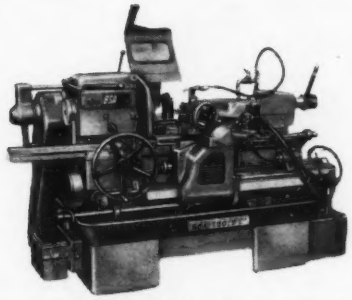
B.S.A.
repetiti
forms.
slide ca
from a
groovin
and tai
stroke
speeds

B.S.A.
several
Turret
the lar
turret.
tapping
for aut

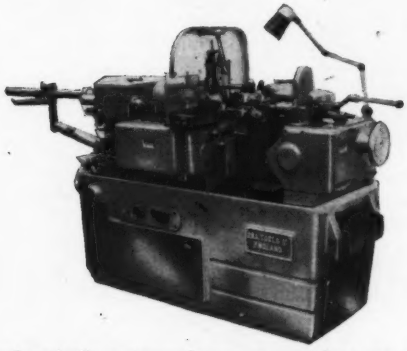
B.S.A.

Sole A
BURT
Mackad
Telepho

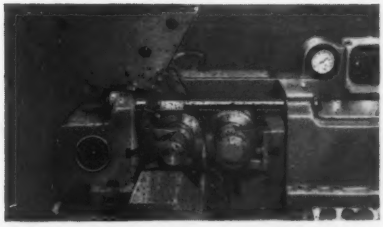
B·S·A production machines



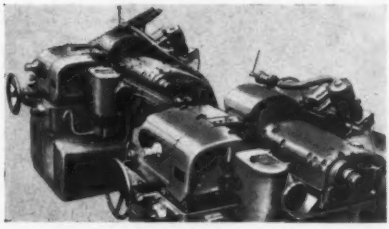
B.S.A. C.L.1 copy turning lathe. For small batch or quantity repetition copy turning multi-diameter shafts, spindles and similar forms. The tracer arm is linked through the hydraulic system to a slide carrying a single-point turning tool. An attachment for copying from a flat template can be supplied as can a rear slide for facing and grooving. Swing over tool slide 8". Distance between spindle flange and tailstock centre 28". Longitudinal travel of tool 26". Transverse stroke of hydraulic slide 2⅞". Diameter of Master 5¼" max. Spindle speeds 217 to 1,810 r.p.m. Feed range 0.003" to 0.030".



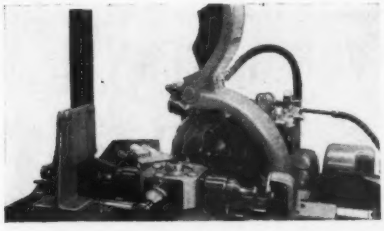
B.S.A. single-spindle automatic screw machines are made in several types including ½", ¾", 1", 1¼", 1⅝" and 2" diameter capacity. Turrets have six stations, but eight station turrets can be fitted to the larger machines. All sizes are arranged for double indexing of turret. A wide range of attachments includes screw-slotting, nut tapping, rear end drilling, cross drilling, spindle brakes and devices for automatic loading for second operation work.



B.S.A. form generator equipped for rolling threads ⅜" dia. on both ends of rod-type component. Two pieces rolled per revolution of the dies, output 90 components per minute. Components are fed from a hopper with an internal adjustable locating plate which permits feeding of parts varying from 4⅜" to 6" long and holds 1,000 workpieces.



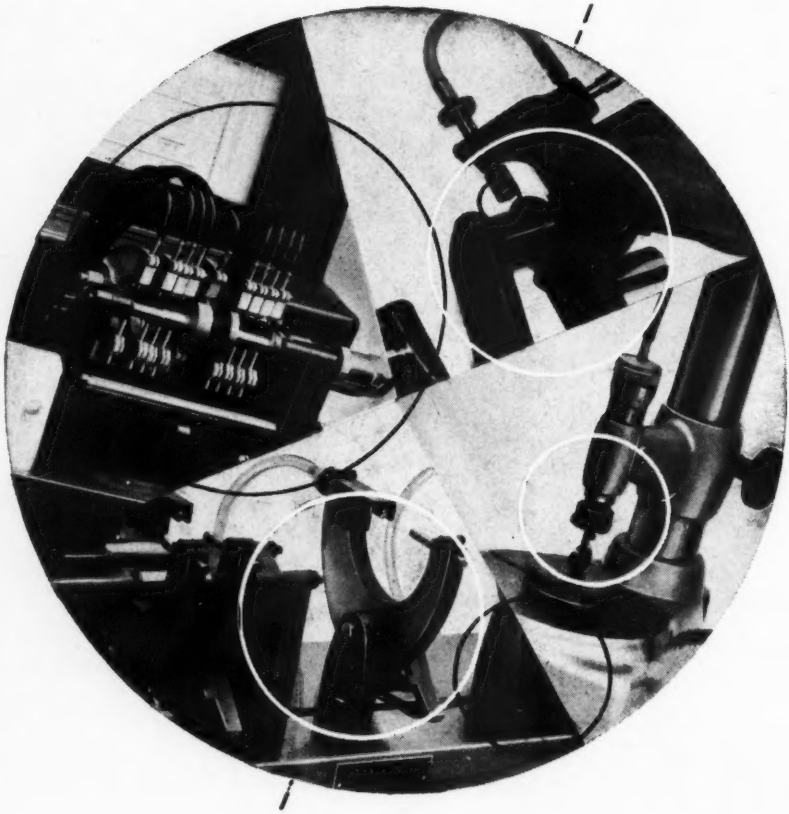
Two B.S.A. No. 8 centreless grinding machines linked for transfer of component for two operations. A chute type magazine gravity-loads workpieces to an endless chain conveyor. On completion of grinding on the first machine the components are passed by intermediate conveyor to the workplate between the wheels of the second machine for another grinding operation.



Cup type components delivered from a magazine are received by revolving collets on the turret faces and presented to the chuck for machining from the cross slides on this **B.S.A. 5M fully automatic chucking machine.** Turret index brings a finished component to the station where it is stripped from the collet pneumatically while the succeeding component is being machined. Cycle times: 9 to 15 seconds (depending on the size of the component for which the set-up is adjustable).

B.S.A. TOOLS LTD., BIRMINGHAM, 33, ENGLAND
CABLES: MADRICUT BIRMINGHAM TELEX 33207
Sole Agents Gt. Britain
BURTON GRIFFITHS & CO. LTD.
Mackadown Lane, Kitts Green, Birmingham
Telephone: STECHFORD 3071

492



FOR EXTERNAL MEASUREMENT OF DIAMETERS

ONLY SOLEX HAVE THE MEASURE OF THINGS

Solex (Gauges) Limited, 72 Chiswick High Road, W.4. CHIswick 4815

When answering advertisements kindly mention MACHINERY.

MACHINERY is registered as a newspaper at the General Post Office and is published every Wednesday by The Machinery Publishing Co., Ltd. The name is a registered trade mark.
All rights of reproduction and translation are reserved by the publishers by virtue of the Universal Copyright and International Copyright (Brussels and Berne) Conventions and throughout the World.

© The Machinery Publishing Company Limited, 1961.

LONDON OFFICE

REGISTERED OFFICE, EDITORIAL, SMALL AND CLASSIFIED ADVERTISEMENTS DEPARTMENTS AND ENQUIRY BUREAU

CLIFTON HOUSE
83-117 EUSTON ROAD
LONDON, N.W.1
Telephone: Euston 8441/2
Telegrams: Machtool, Norwest, London

HEAD OFFICE

SUBSCRIPTION, ADVERTISEMENT, SERVICE, PHOTOGRAPHIC, ACCOUNTS AND BOOK DEPARTMENTS

NATIONAL HOUSE
21 WEST STREET,
BRIGHTON, 1

Telephone: Brighton 27356 (4 lines)

Telegrams: Machtool, Brighton

NEW YORK: 93, Worth Street

PARIS: 15, Rue Bleue

Managing Director: LESLIE R. MASON
Editor: CHARLES H. BURDER
Chief Associate Editor: P. A. SIDDERS
Associate Editors: A. P. LIPSCOMBE, L. WILSON, G. W. MASON, S. C. POULSEN, R. E. GREEN, A. W. ASTROP, A. J. BARKER
Editorial Representatives: F. W. HERRIDGE, R. SUTCLIFFE

PRICE PER COPY:—One shilling and threepence.

SUBSCRIPTIONS:—Inland and overseas, 52 shillings per annum (and pro rata), post free. Cheques and Money Orders should be made payable to the Machinery Publishing Co., Ltd.

ADVERTISEMENTS:—Copy for displayed advertisements, if proofs are required, should reach the Brighton office 21 days in advance of publication. Rates on request.
Small (classified) advertisements can be accepted, space permitting, at the London office up to Wednesday, for publication on the following Wednesday. For rates, see p. 147.

Blocks are held at advertisers' own risk; no responsibility for loss is accepted by the publishers.

MACHINERY

A JOURNAL OF METAL-WORKING PRACTICE & MACHINE TOOLS

Vol. 98, No. 2534 June 7, 1961

MEMBER OF THE AUDIT BUREAU OF CIRCULATIONS

COPIES PRINTED ..... 11,500 per week
CERTIFIED DISTRIBUTION ..... 11,293 per week
CERTIFIED PAID DISTRIBUTION ..... 9,827 per week
Copies sold at full price ..... 9,594 per week
Copies sold at reduced prices ..... 233 per week

CONTENTS

Editorial PAGE

Applications of Electrostatic Forces 1275

Principal Articles (*For abstracts see next page*)

The Quantity Production of Poppet Valves 1276
Equipment for Marking-out Castings and Forgings 1285
Cross Pallet-type Transfer Machine for Operations on Motor-car Steering Gear Housings 1287
Fosdick Numerically-controlled Jig Boring Machine .. 1290
Russian Automatic Transfer Machines at the Leipzig Fair .. 1293
Production of Components for Compressed Air Equipment 1303
The Staveley Group Research Department 1309
Assembling Domestic Radio Sets 1313

Short Articles

Crane Girder Used to House Equipment 1284
Rotary Coolant Filter for 72-in. Aluminium Rolling Mill .. 1289
Large Plastics Vacuum Chamber 1292
Use of Noral 28S Alloy for Lens Mounts 1302
B.O.C. Automatic Line Following Unit 1302
Staffa 18-in. Pipe Bending Machine 1308
Calor P4 Flame Cutter 1317
Machine Tool Industry Research Association 1318

News of the Industry

Tyneside 1319
Machine Tool Orders 1320
The South 1321
Industrial Notes 1322
Scrap Metals Report 1324
Machine Tool Share Market 1325
British Machine Tool Imports and Exports (Classified) .. 1326
Prices of Materials 1328

Classified Advertisements 147
Index to Advertisers 179

Abstracts of Principal Articles

The Quantity Production of Poppet Valves P. 1276

This article, which is the last of three, is concerned with the final operations on poppet valves for the range of passenger car and commercial vehicle engines produced by Vauxhall Motors, Ltd., Luton. The stem ends are hardened by an automatic machine on which the valves are loaded into fixtures on an indexing table, heated by high-frequency induction, and quenched in oil. Next, the stem ends are lapped on a machine with a capacity for 54 valves per load, which operates on a 2-min. cycle. Finishing of the stems on a centreless grinder is followed by marking on an automatic machine. Subsequently, the seats are ground on a battery of special machines, arranged for automatic loading. Inspection is performed on two automatic, multi-dimensional machines. Finally, details are given of a form-grinding operation for producing the collet grooves in valves for commercial vehicle engines. (MACHINERY, 98—7/6/61.)

Russian Automatic Transfer Machines at the Leipzig Fair .. .. .. P. 1293

Much interest was aroused by the two Russian-built automatic, in-line, transfer machines shown at this year's Leipzig Spring Fair. One of these machines, for milling, drilling, counter-boring, boring, facing, and tapping operations on aluminium-alloy oil filter housings for diesel engines, is here described. The cycle time is 1 min., and platen-type fixtures are employed in which the hand-loaded castings are power-clamped. Indexing is by a transfer bar moved by one of the face-milling heads. At one point, the platen is turned through 90 deg. for drilling and other operations, and after being returned to the original orientation it reaches a lateral track whereon it is moved to a station at which all the holes are simultaneously tapped. Subsequently, the platen is raised into a cleaning station for the disposal of swarf, and it then moves along return conveyors to the unloading and loading station. (MACHINERY, 98—7/6/61.)

Production of Components for Compressed Air Equipment .. .. .. P. 1303

Plant at the Farnham works of Martonair, Ltd., and Nuquip, Ltd., includes machines which have been built by the company for the quantity production of component parts for air cylinders and for performing various operations on pressure die-cast heads for lubricators incorporated in compressed air lines. Details are given of these machines which are fully automatic in operation, and compressed air equipment is extensively employed for such purposes as work feeding and clamping. One of the machines provides for drilling two intersecting stepped-diameter holes in brass end covers for air cylinders. Tie bars for air cylinders are chamfered at both ends in two stages at a fully-automatic cycle on another machine, and screwcutting is then carried out on an Edgwick machine, which has been fitted with work-handling equipment and converted for automatic working by the company. (MACHINERY, 98—7/6/61.)

The Staveley Group Research Department .. .. P. 1309

Formed in 1956, at the instigation of Sir Ben Lockspeiser, the Staveley Group research department is now housed in premises at Clapham, near Bedford, which have a floor area of 12,000 sq. ft., and a new building, of 3,000 sq. ft. area is planned. The department is intended to serve the machine tool companies within the group—including James Archdale & Co. Ltd., and Geo. Richards & Co., Ltd.—and has sections devoted to mechanical engineering, control systems and electronics. There is a staff of 50, of whom more than half hold H.N.C. or higher qualifications. Work of the department includes investigations into hydro-static slideways, thrust bearings, feed screws, and worm and rack drives; the investigation of machine structures with the aid of Perspex models; research into hydraulic motors for machine tool drives; and contour milling under the control of tapes produced with the aid of a computer developed by the department. (MACHINERY, 98—7/6/61.)

Assembling Domestic Radio Sets P. 1313

Corran Works, Ltd., a member of the Pye group of companies, was one of the first companies to establish a plant in Northern Ireland under the Government's post-war development scheme, and several million radio sets have so far been assembled. At peak periods, as many as 34 different types of radio sets, of conventional valve and transistor types, have been in progress through the works, and in this article some aspects of the practice and equipment employed are described. Attention is drawn to a mechanical aid for a small sub-assembly; mobile test equipment; a modified wire-cutting and stripping machine; and continuous flow-soldering equipment. (MACHINERY, 98—7/6/61.)

Contributions to MACHINERY

If you know of a more efficient way of designing a tool, gauge, fixture, or mechanism, machining or forming a metal component, heat treating, plating or enamelling, handling parts or material, building up an assembly, utilizing supplies, or laying out or organizing a department or a factory, send it to the Editor. Short comments upon published articles and letters on subjects concerning the metal-working industries are particularly welcome. Payment will be made for exclusive contributions.

EDITORIAL

Applications of Electrostatic Forces

In connection with various industrial processes, the incidental generation of electrostatic charges, which may be of considerable magnitude, is undesirable both on account of the effects that they may have on the behaviour of the materials that are being handled, and, in certain circumstances, the associated risks of shock or ignition. On the other hand, the fact that forces of attraction or repulsion are set up between objects or particles which carry artificially induced charges, has been turned to practical account for various purposes, and certain processes based on this phenomenon are of growing practical importance.

Among the better-known applications of the electrostatic principle is the precipitation of contaminating particles of dust or fluids in air to achieve the degree of cleanliness which is now essential for various manufacturing and assembly operations, or to ensure working conditions of the desired standard. In an electrostatic filter, the particles are first charged as the air passes through an ionizing section and are subsequently attracted to electrodes of opposite polarity on which they are deposited. It is stated that with such equipment particles as small as 0·01 micron diameter are removed from the air stream. A similar technique may be employed to cleanse air of the mist and smoke generated from cutting oil during machining operations. Electrostatic paint spraying, which has assumed such great significance in recent years, is similar in many respects to electrostatic filtration. Here, again, charged particles are effectively attracted to surfaces of opposite polarity—in this case the work to be painted—with the result that losses due to overspray, which may otherwise be so substantial, are greatly reduced. With this process, the paint particles are charged by the special atomizing units, and the work is normally earthed. As an indication of the economies that can be obtained, it may be noted that for one installation at a motor car factory, the estimated paint loss is now less than 2 per cent, as compared with 50 per cent for normal spray guns. The fact that paint is used more effectively also results in high output. It is claimed, moreover, that smooth and uniform coatings are obtained, and that duplication can readily be achieved owing to the elimination of variables. Further advantages are afforded by the fact that ventilation requirements are reduced, and that no special provision need be made for the collection and disposal of overspray.

In a more specialized field, advantage is taken of electrostatic effects to improve the quality of coated abrasive products. The backing paper or cloth, with the adhesive-treated surface downwards, is arranged to pass above a conveyor on which the abrasive grain is carried. Provision is made for simultaneously charging the grain and the backing material to opposite polarity, with the result that the grain is attracted upwards with considerable force and becomes embedded in the adhesive. A refinement associated with this method depends upon the fact that charges tend to be concentrated at sharp points. Silicon carbide particles, in particular, are normally of elongated shape with pointed ends, and such particles approach the adhesive film end-on and are securely anchored. Moreover, the points at the opposite ends of the grains project to form an effective cutting surface. A further advantage is that the charged grains repel one another and therefore assume an even spacing before entering the adhesive.

Other specialized electrostatic processes, which are of considerable interest to engineers, provide for copying documents or drawings and for forming X-ray images. For the latter purpose, a metal plate with a thin layer of selenium is sensitized by application of a uniform electrical charge. On exposure, the selenium conducts the charge to the backing plate in proportion to the intensity of the X-rays and an electrical image results. The latter is then rendered visible by blowing a charged powder across the surface, and can be observed under side lighting in a special viewer.

A more ambitious application of electrostatic forces is for work-holding on machine tools, which should form a valuable addition to the available methods of securing parts made from non-magnetic metals or other materials which do not conveniently lend themselves to mechanical clamping. These methods, it may be noted, include vacuum chucking, the use of double-sided adhesive tape, and—in special circumstances—the anchoring of workpieces in ice or solidified wax. The electrostatic chuck, to which reference has previously been made in MACHINERY, has a ceramic body with a thin film of epoxy resin on the upper surface, and metal fences at one side and end, with which the workpieces must be in electrical contact, either directly or indirectly. Before the work is placed in position, the chuck surface is treated with dielectric

(*Continued on page* 1322)

The Quantity Production of Poppet Valves

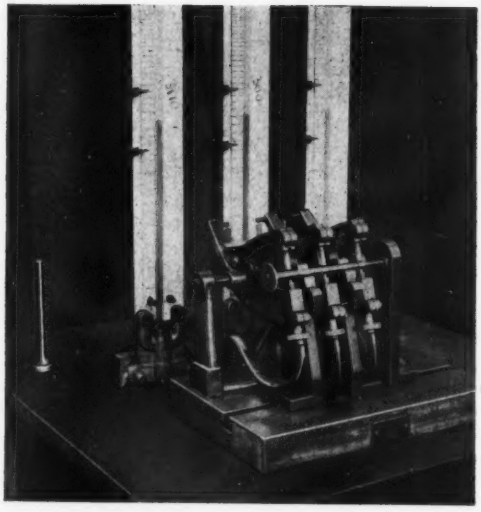
Methods Employed by Vauxhall Motors, Ltd., Luton

By R. E. GREEN, Associate Editor

TWO ARTICLES IN MACHINERY, 98/808—12/4/61 and 98/1164—24/5/61, have been concerned with machining and other operations on poppet valves for the range of passenger cars and commercial vehicles made by Vauxhall Motors, Ltd., at their Luton works. Cutting off from the bar, flash butt welding of lengths of dissimilar metals, electrical upsetting, forging, and heat treatment, were considered in the first of these articles. In the second, reference was made to the straightening of stems in an adapted flat-die thread-rolling machine, cutting-off and grinding stems to length, an automatic transfer conveyor whereby the valves are fed to a centreless grinder for semi-finishing the stems, an automatically-loaded multi-spindle automatic for turning the outside of the head and the seat, and a special machine for plunge-forming the oil seal and cotter grooves at the rate of 12 valves per min.

The next operation provides for hardening the stem end to between 50 and 51 Rockwell C, and is performed on the special machine shown in Fig. 1 which was designed by Vauxhall Motors, Ltd., and built for them by the Middlesex Tool & Gauge Co., Ltd. On this machine, the valves are automatically loaded, heated by the Radyne (Radio Heaters, Ltd.) 9-kW. high-frequency induction unit at the right, and ejected, at the rate of 12 per min. Valves are placed by the operator in the chute *A*, formed from two parallel steel bars, in which they are suspended by the heads. The valves slide down the curved chute to a position at which they are arrested by the upper of two stops attached to the top of the long escapement lever *B*, the lever being pivoted just below the centre.

These two stops are so shaped that they project towards the valves in the chute from either side, and there is space for one valve between them. The lever pivot shaft is connected to the armature of a solenoid in the adjacent box, and when the solenoid is energized, the upper end of the lever is moved in a direction away from the camera,



against the pressure of a spring. This movement brings the upper of the two stops clear of the lowest valve in the chute, permitting it to slide down into contact with the second stop, which has been advanced by the same lever movement. When the current to the solenoid is cut off, the lever is returned by its spring and the second stop releases the valve which is free to pass down the chute. Other valves in the chute are, however, retained by the first stop, as before.

At the lower end of the chute, the valve is supported by two stops at the bottom of the lever *B*, these stops being so arranged that they hold the stem at an angle of about 30 deg. above the edge of a rotary indexing table. At the periphery of this table are 18 similar holding fixtures, also arranged at an angle of 30 deg., and successive movements, imparted by a continuously-driven Geneva mechanism, bring the fixture, in turn, into position beneath the lower end of the chute. Each fixture has a fixed and a moving jaw, the latter, which is spring-loaded towards the closed position, being opened by a cam beneath the table as the fixture approaches the bottom of the chute.

When the lever *B* is next operated, the stops at the lower end are retracted, and the valve is allowed to fall into the open jaws of the fixture, in which it is held between V-grooves in the opposing

faces. As the table is subsequently indexed, in an anti-clockwise direction as viewed from above, the lever whereby the moving jaw is operated is carried clear of the cam, and the jaw is closed by the spring to grip the valve. Further indexing movements of the table carry the valve round until the outer end of the stem comes into contact with the cam *C*, on a bracket at one side. As the valve is moved past this cam, it is pushed down in the fixture to a pre-determined level.

Subsequently, the valve is indexed into engagement with the first of two water-cooled heater coils supplied from the Radyne unit with current at a frequency of 450 kc. per sec. These heater coils are carried on a slide, on which they can be adjusted to bring them into the correct position for the length of valve stem to be hardened, and clamped in place, and they serve to heat the stem to a temperature between 850 and 870 deg. C. The period between the indexing movements of the machine is 5 sec., and each of two valves is heated by a coil for this period. On leaving the second coil, the valve is at the required temperature, and is immediately carried through a copious flow of light quenching oil from a sheet metal trough at the far side.

This trough extends over about four fixture positions, and the oil is pumped up from an open tank beneath the machine, and returns by gravity from the centre of the table. After leaving the trough, the fixture reaches the position at which the cam operates the moving jaw, and the valve slides out of the fixture, down a chute at the centre of the table, and out of the machine at one side. Hardness checks on the stems are carried out on sample valves twice during each shift, on a Reicherter (Lerche Machine Tools, Ltd.) testing machine installed in the shop.

LAPPING THE STEM ENDS

From the hardening machine the valves are passed to the 24-in. Lapmaster (Payne Products International, Ltd.) machine shown in Fig. 2, on which the ends of their stems are lapped flat, smooth, and at right angles to the axes. The flat lapping table on this machine supports three plates with deep grooves which assist in the continuous distribution of the lapping compound. These plates, which are of 10 in. diameter, are prevented from being carried round by means of brackets secured to an annulus surrounding the table. Each bracket has two rollers which are in contact with the outside of the plate, so that the latter can revolve on its own axis.

The plates are caused to turn owing to the difference in the surface speed of the table at the centre and the periphery, and their motion assists in maintaining the surface of the table flat and smooth. Each plate carries a holder with 18 bushed holes of a bore diameter in which the stems are a sliding fit, and these holders can be changed when valves of a different stem diameter are to be lapped. Columns at each side of the machine support slotted bridge pieces, and the latter carry brackets on which three vertical air cylinders are mounted, one directly above each of the plates.

On the ram of each cylinder is carried a floating flat disc, to which is attached a pad of resilient plastics material, whereby a light load is applied to all the valves in the holder during the lapping operation. A valve at the side of the cylinder

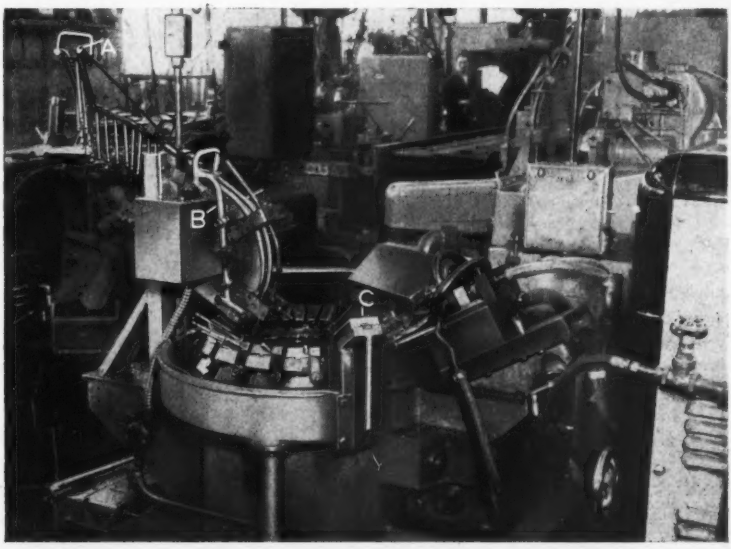


Fig. 1. On this automatic machine for induction-hardening valve stem ends, the valves are placed in the chute *A* by the operator and are discharged automatically at the end of the hardening cycle

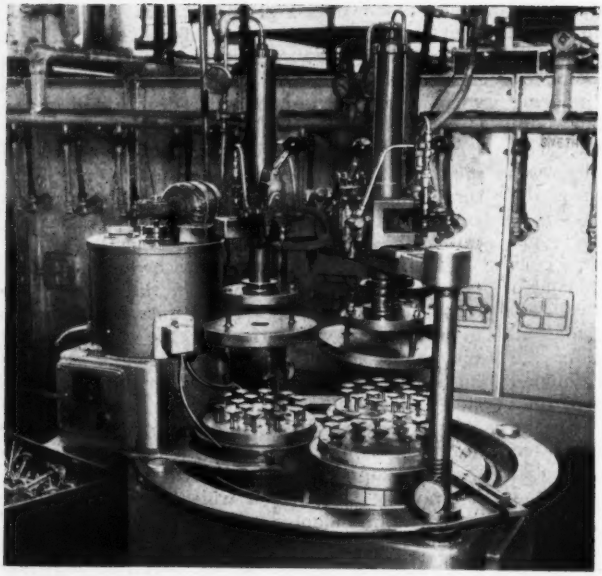


Fig. 2. After the hardening operation, the ends of the stems are finished on this Lapmaster machine which has a capacity for 54 valves per load. Steel pads, covered with resilient material, apply load to the valve heads during lapping

provides for lowering and raising the ram, and when the latter is fully lowered the flat disc rests freely on the valve heads, no pressure being applied by the cylinder. Lapping is performed with the table rotating in an anti-clockwise direction, and number 2220 lapping compound, supplied by Payne Products International, Ltd., is delivered through a capillary tube from the tank at the left, which is fitted with a motor-driven agitator.

The cycle time on this machine, governed by a timer on the housing beneath the compound tank, is 2 min., which is sufficient for cleaning up the end faces of the valves, and the compound used gives a surface finish of 12 micro-inches r.m.s. From this machine, the valves are transferred to one of a series of Cincinnati centreless grinders on which the stems are finished, to a diameter of 0·3410/0·3417 in. for the Velox and Cresta exhaust valves, for instance. The machine is provided with automatic loading and unloading equipment, as described in MACHINERY, 86/1438—24/6/55, in the form of an indexing table on which the valves are held in peripheral slots at a slight angle to the horizontal, with the heads projecting.

From this table, the valves are automatically lifted by a pivoting arm, fitted with gripping fingers, and placed on the work rest between the grinding and control wheels. During the grinding cycle, the pivoting arm is returned in readiness for picking up the next valve, and the ground valve is thrust from the work rest between the wheels by an ejector rod. The grinding cycle occupies about 3 sec., and loading and unloading, 2 sec., so that a table slot must be reloaded by the operator every 5 sec. For inspecting the diameter of the stem at three positions, the Solex gauge shown in the heading illustration is employed.

AUTOMATIC MARKING MACHINE

At the next operation, each valve is marked on the stem with the company's symbol, on the automatic Funditor machine shown in Fig. 3. Automatic loading equipment on this machine incorporates a parallel-bar chute similar to that provided on the induction hardening machine, down which the valves pass to a double stop on the lever *D*. This lever is similar to that indicated at *B* in Fig. 1, with the upper end spring-loaded towards the right, and was formerly operated by a solenoid in the box at the right. With the arrangement now employed, a wire connects the lever with a stud on the marking slide of the machine, so that when the slide reaches the end of its travel towards the left, the lever is pulled in the same direction.

As the slide returns to the right, the wire follows the stud, and the spring returns the lever *D* to its original position. At each operation of the lever, a valve passes between the two stops at the top and slides down to two other stops, at the lower end. When these stops are retracted, at the next movement of the lever, the valve falls out of the chute on to a conveyor. This conveyor has two vertical plates which provide bearings for shafts carrying pairs of chain sprockets. Small slotted brackets to hold the valves are riveted to the two endless chains that pass over the sprockets.

The conveyor is mounted on a slide, on which it can be adjusted towards or away from the machine column to bring it into the required position in relation to the marking head. On the left-hand shaft of the conveyor is mounted a toothed indexing wheel, in addition to the sprockets, and

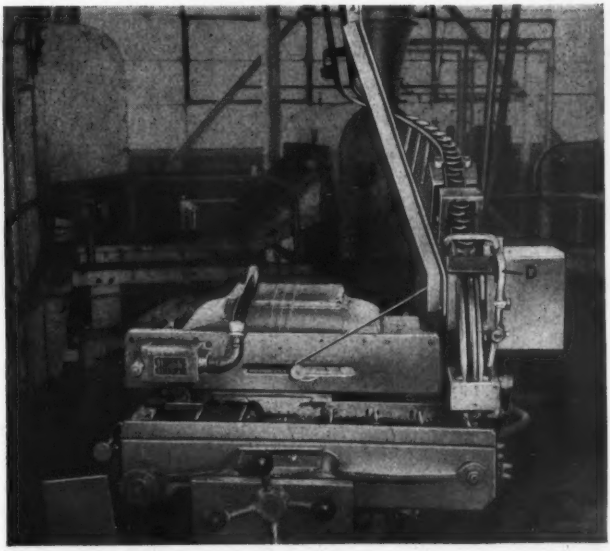


Fig. 3. On this Funditor marking machine, the company's trade mark is impressed on each valve stem. The transfer conveyor is operated by a pawl on the marking slide, and marking is performed on the return stroke

the teeth of this wheel are engaged by a pawl on the marking slide in the head of the machine. As the slide moves to the left, the conveyor is indexed one space in the same direction, and a fresh valve is carried into the marking position. At the same time, a valve is loaded into the empty conveyor position at the right-hand end.

At the marking position, the valve is supported by two rollers beneath the point at which marking is to be performed. As the valve moves into this position, it is lifted slightly so that it rides over the first of the two rollers and comes to rest between them. The marking slide, which is continuously driven, is then returned to the right, and the head passes across the valve which is supported by the rollers, turning it slightly, and impressing the symbol into the stem. When the slide again moves to the left, the indexing pawl automatically advances the conveyor.

The marked valve is thus carried away from the marking position, riding over the second supporting roller, and a fresh valve is moved into place. At the left-hand end of the conveyor, the valves fall from the carrier-slots and slide down a chute.

FINISH-GRINDING VALVE SEATS

Finish-grinding of seats, to angles of 29 and 44 deg. ±15 min., for the inlet and exhaust valves respectively, is performed on a battery of Landis machines, each of which is arranged for entirely automatic operation. In the general view of one of these grinders given in Fig. 4, may be seen the parallel-

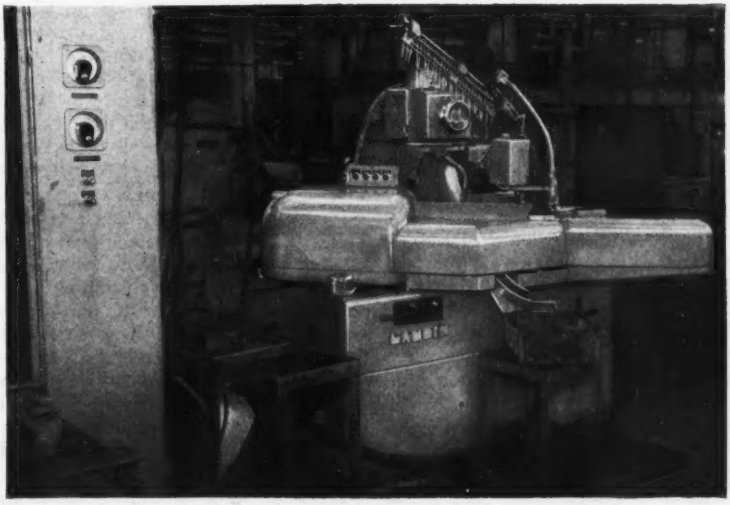


Fig. 4. A general view of one of the Landis machines employed for finish grinding valve seats to angles of 29 and 44 deg. ± 15 min. Approximately 0·007 in. is removed from the seat in a period of 8 sec.

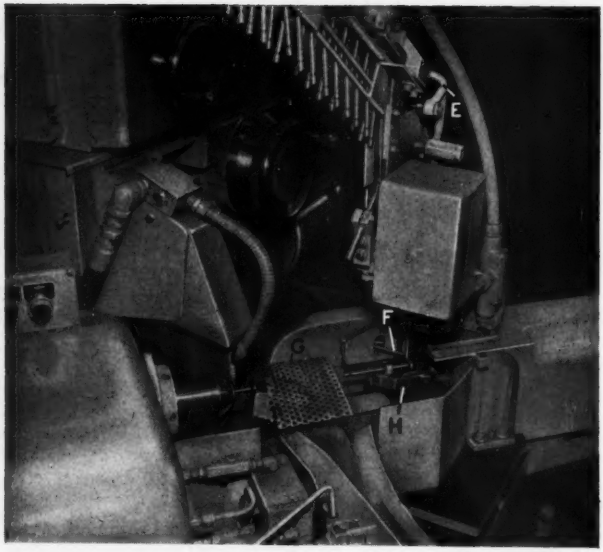


Fig. 5. This close-up view of the working area of the Landis machine shows the loading mechanism and the hinged chute *G* which is raised by an air cyclinder when the valve is advanced

bar chute into which the valves are loaded by the machine-minder, who tends three machines. The table of the machine can be adjusted to any desired angle in relation to the wheel spindle axis by means of special length blocks, which are interposed between datum faces on the side of the table and a bracket on the bed.

The escapement mechanism at the bottom of the loading chute is similar to that provided on the machine in Fig. 1, and is shown in the close-up view in Fig. 5. The lever *E*, operated by a solenoid in the adjacent box, allows the valves to pass down, one at a time, to the bottom of the chute. Here, each valve is arrested by the stop *F*, at the bottom of the lever, and when this stop is withdrawn, after the completion of the previous loading operation, the valve is allowed to fall into V-locations in a bracket. This bracket is attached to a slide, which is operated by a horizontal air cylinder, carried on an extension at the right-hand end of the table, and when the previously-finished valve has been ejected, the slide is advanced to the left.

As the slide moves forward, the hinged end of the chute *G*, which has a cover of perforated sheet metal, is lifted clear by an air cylinder. The loading slide can then advance the end of the valve into the collet. As the loading slide continues to advance after the end of the valve has entered the collet, a stop on the table comes into contact with a downward extension of the centrally-pivoted lever *H*, which supports the outer end of the valve stem in a V-block. This stop causes the lower end of the lever to rise, with the result that the upper end is lowered, and the V-block is carried down, clear of the collet. The valve can then be pushed into the chuck up to a stop, formed by the end of the air-operated ejector in the work spindle.

With the valve fully home, the work spindle collet is closed to grip the stem and the grinding cycle of the machine is started. The cycle is automatically controlled by equipment in the cabinet at the left in Fig. 4, which includes timers for setting the length of the spark out period, after the wheel-head has been fed to a fixed position, also for setting the number of complete grinding cycles to be performed before the automatic dressing cycle is initiated. At the start of the cycle, with the loading slide withdrawn, the wheel-head is brought forward, in a direction at right angles to the valve seat, to the grinding position, and is subsequently fed through a distance of about 0·012 in. during a period of 8 sec.

At the end of this movement, the head is caused to dwell for 3 sec. before being automatically retracted. The wheel employed is of Universal MA 46/60 N-V specification, and during the operation it is oscillated sideways at the rate of one complete reciprocation per sec. to distribute the wear across the wheel face and prevent the formation of a groove. At the end of the dwell period, the wheel-head is retracted, the collet is opened, the ejector cylinder is energized, and the valve is pushed out into the chute *G*. The cycle time is 14 sec., and after 12 of the two-piece Velox and Cresta exhaust valves (seen in Fig. 5) have been ground, the automatic dressing cycle is initiated.

During dressing, the diamond, in the unit above the wheel, is advanced by 0·0015 in. for each of two passes, to remove a total of 0·003 in. At the same time, the wheel-head is advanced through a similar distance to compensate for the material removed. A light cutting oil is applied to cool the work during the grinding cycle and is cleaned before recirculation by passing it through a centrifuging unit supplied by Machine Shop Equipment,

Fig. 6. Inspection of finished valves, at the rate of 4,000 per 8-hour shift, is performed on this Sigma, multi-dimensional, 2-stage automatic machine, which is one of two installed in the valve department

Ltd., the rotor of which runs at 2,800 r.p.m. At this operation, the dimension from the stem end to the seat centre-line is held to limits of ±0·0075 in., and the eccentricity of the seat with the stem to 0·002 in.

INSPECTION OPERATIONS

After the seat-grinding operation, the valves are washed in readiness for inspection on one of two automatic Sigma (Alfred Herbert, Ltd.), multi-station, two-stage machines, as seen in Fig. 6, where Victor exhaust valves are being checked. Before the valves are fed into the automatic machine, the condition of the seat, stem, cotter and oil seal grooves, stem end, and head face are inspected visually for blemishes. Valves which pass this visual test are placed on a flat inclined platform at the front of the machine, on which they are supported only by the stems, with the heads overhanging the left-hand edge. The valves roll down the inclined surface, one at a time, to a stop at the lower edge.

In the close-up view of the machine given in Fig. 7, a valve may be seen at the lower end of the chute. Beneath the chute there is a loading slide, operated by an air cylinder, and this slide has a recess into which the valve drops when the chute is retracted. The valve is then carried forward to the first gauging position, at which the concentricity of the seat with the stem, and the run out of the stem end face are checked. For these checks, the valve rests on carbide-faced locating pads, and the head face is engaged by a friction pad on the end of a shaft driven by a small Klaxon geared motor unit. The pad is moved sideways, into contact with the head face, by a small single-acting, air cylinder *J*, and the motor runs continuously.

True running of the stem is checked at two positions, by two of the gauging heads *K*, and the nearer head, of

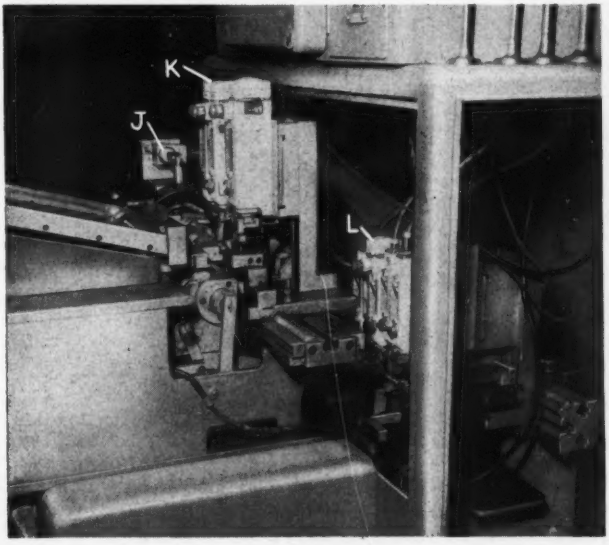


Fig. 7. A close-up view of the Sigma machine from one side, showing the air cylinder *J* whereby a pad, driven by a small geared motor unit, is pressed against the head face to rotate the valve during gauging

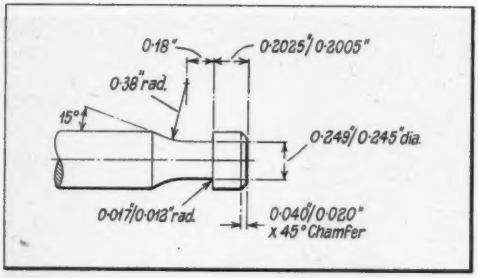


Fig. 8. Drawing showing details of the collet groove required in the exhaust valve for a commercial vehicle engine. Because of the hardness of the stems of such valves, the grooves are ground from the solid

similar type, is provided with a bell-crank lever which makes contact with the stem end of the valve. Eccentricity of the seat is checked by another electronic head, fitted with a caliper, which is mounted horizontally at the far side. At the completion of this first stage, the valve is withdrawn on the loading slide, from which it is then pushed by small stops, and falls into a slot in a transfer drum. Partial rotation of this drum delivers the valve to a second loading slide beneath, whereby it is carried to the second measuring station.

Valves rejected at the first stage are automatically ejected from the drum, and pushed out of the machine into a box at the far side. Those valves which pass the first inspection stage are carried forward by the second loading slide, and rest on another set of carbide-faced pads while checks are made by the lower set of gauging heads *L*. Three of these heads are fitted with floating caliper contacts which measure the diameter of the stem at the ends and near the centre, and a fourth head measures the diameter of the collet groove. Another head is employed for checking the length of the valve from the seat to the stem end.

From this position, the valve is withdrawn by the loading slide, and passes down a chute, over shutters which are automatically operated to direct it to one of three outlets leading to containers or to a conveyor. Valves are thus separated into groups which are too large or too small on one or more dimensions, and those which are acceptable and can be passed straight to the packing area. Here, the valves are dipped in a lanolin-oil emulsion, drained, and packed in waxed paper in tins for consignment either to the assembly or the spares department.

An automatic Lindberg machine is shortly to be installed for aluminizing the heads of most of the exhaust valves produced. This operation, which we hope to describe at a later date, will be performed after the valves have been inspected on the Sigma machine.

SPECIAL PLUNGE-GRINDING MACHINE FOR COLLET GROOVES

Plunge-forming of the collet grooves in the stems of valves for passenger cars, on a special machine of Vauxhall design, was described in a previous article, and this operation is also per-

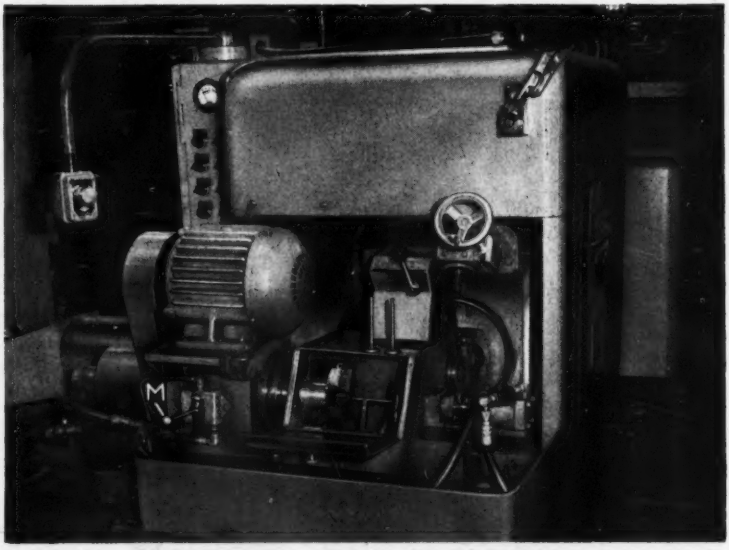


Fig. 9. Grooves of the type shown in Fig. 8 are plunge-ground on this type E Jones & Lamson machine in a cycle time of 15 sec. Mist-laden air extracted from the cabinet is filtered in a Precipitron electrostatic unit

formed on a battery of Britan lathes when extra capacity is required. As mentioned in the first article, however, the heat treatment applied to commercial exhaust valves is such that they are left in an extremely hard condition, and the collet grooves in these valves can only be machined by grinding. The dimensions of a typical groove, in an exhaust valve for a commercial vehicle engine, are shown in Fig. 8.

Such grooves, in hard valves, are ground from the solid on the Jones & Lamson (Buck & Hickman, Ltd.), type E, automatic form-grinder shown in Fig. 9, in a cycle time of 15 sec. On this machine, the wheel-head spindle, which is driven by a 5-h.p. motor, is run at 2,400 r.p.m. for a new, 20-in. diameter wheel, to provide a surface speed of 12,500 ft. per min. As the wheel is reduced in diameter, the spindle speed is increased by the use of different pulley combinations to maintain this surface speed, and the wheel is discarded when it has been reduced to 17½ in. diameter.

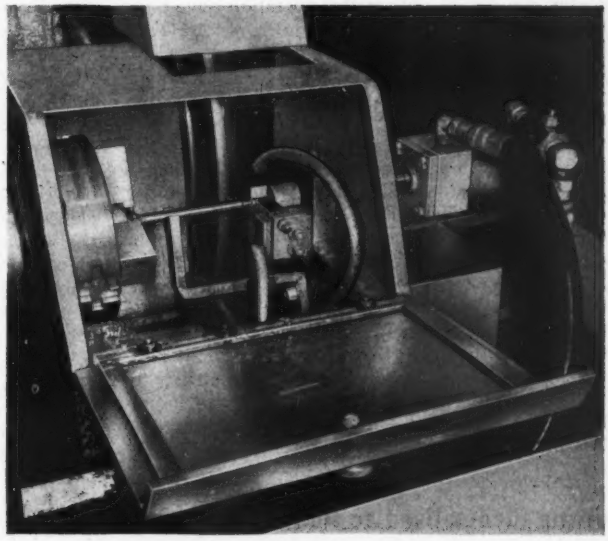


Fig. 10. Close-up view of the working area on the Jones & Lamson machine showing the method of holding the valve by the head in a 3-jaw chuck, and supporting the stem end against the grinding thrust

A close-up view of the work-spindle is given in Fig. 10. It is equipped with a 3-jaw, pneumatically-operated chuck, with jaws of special design which grip the valve on the outside of the head. Location is taken from the end face of the stem, since a tolerance of 0·002 in. must be held between this face and the shoulder of the groove. For loading, the valve is placed in a V-groove in the upper end of a bracket, with the stem end resting between carbide-faced pads clamped to the tailstock quill. When the valve *M*, Fig. 9, is operated to close the chuck, an air cylinder advances the tailstock quill, to push the valve into the chuck jaws, against a spring-loaded ejector. This ejector holds the stem end in contact with a carbide-faced locating pad on the tailstock quill while the chuck is closed.

As the valve enters the jaws, it is lifted slightly, so that it is held clear of the V-groove in the bracket. The automatic grinding cycle of the machine is then started, and with the work-spindle running, the wheel-head is advanced by a cam which provides for roughing, finishing, and sparking-out periods during a total time of 9 sec. The wheel is then withdrawn and the work-spindle is stopped in readiness for unloading the valve. A copious flow of a light cutting oil is applied to the work during the grinding cycle, and the fine mist produced is confined within the cabinet. This mist is of a potentially explosive nature, and the cabinet is therefore connected to a Westinghouse Precipitron electrostatic filter which continuously extracts air and removes both the oil mist and other particles. A Barnesdrill magnetic separator is provided to clean the cutting fluid.

Two dressing diamonds are carried on a slide at the rear of the wheel—one for each corner—and their movements during the automatic dressing cycle are controlled by cams. Each diamond is accurately located in a holder which is set by means of special blocks, and they are moved across the face from left to right in succession. The leading—right-hand—diamond dresses the surface of the wheel which produces the parallel portion of the collet groove, the radius at the edge for the corner of the groove nearer to the stem end of the valve, and the side of the wheel for the adjacent shoulder. The second diamond comes into action after the first has cleared the wheel, to dress the 15-deg. angle, and the 0·38-in. radius which blends with the parallel portion.

This dressing cycle occupies about 30 sec., and is selected by the operator after about 20 to 30 valves have been ground, depending on the hardness of the material and the quality of the wheel.

So far, the best results at this operation have been obtained with a Universal wheel of A-8OU-B specification. The profile produced in the groove is inspected by the operator on a Heliscope (Salisbury Precision Engineering, Ltd.) projector, fitted with a lens of 25 × magnification, installed adjacent to the grinding machine. With this instrument, an image of the groove can be aligned with a drawing on which there are lines showing the upper and lower limits, and wheel dressing is normally performed when the image outline approaches one of these lines.

Since wear tends to be most pronounced on the wheel edge which produces the 0·012/0·017-in. radius at the stem end of the groove, it is the condition at this point that determines when dressing of the wheel is necessary. Concentricity of the parallel portion of the groove is also important, and is normally held within 0·001 in. on this machine.

Crane Girder Used to House Equipment

In large, overhead, travelling cranes made by the Harnischfeger Corporation, International Division, 4329 West National Avenue, Milwaukee, Wis., U.S.A., the interior of one of the main girders is now being utilized to house the electrical controls and certain components for the electrical power supply system.

View inside the main girder of a Harnischfeger travelling crane, showing the control equipment installation

The first two cranes incorporating this feature have been installed at the plant of the Ash Grove & Portland Cement Co., Chanute, Kansas, and a view of the girder interior is shown in the accompanying illustration. The working aisle measures 8 ft. high by 5 ft. wide, and extends almost for the full length of the 120-ft. girder. To protect the electronic and electrical equipment from the harmful cement dust, the interior of the girder is pressurized by means of a motor-driven blower unit, that forces the air through wool-bag filters which are self-cleaning. A pressure of about 2 lb. per sq. in. above atmospheric is maintained.

To facilitate handling the equipment inside the girder, an electric travelling hoist is provided on a rail just below ceiling level, and a dust proof hatch is incorporated in the floor which permits tools and equipment to be lifted from ground level, 80 ft. below.

Another feature of these cranes is that the four main travelling wheels are individually driven through gearing by separate electric motors. The travelling, hoisting, and cross traversing motors of the crane, and opening and closing of the bucket, are controlled by only two joystick levers, and the electronic equipment provides steplessly-variable speeds. The operator's cab is pressurised and air conditioned because of the dust-laden atmosphere.

CRC 2-26 ANTI-CORROSION AND ANTI-MOISTURE TREATMENT.—Hellermann, Ltd., Gatwick Road, Crawley, Sussex, are the sole distributors in the United Kingdom for the CRC 2-26 anti-corrosion and anti-moisture treatment for electrical and electronic equipment, developed in the U.S.A. by Corrosion Reaction Consultants, 116 Chestnut Street, Philadelphia, Pa. The liquid employed has an unusually low surface tension and will readily penetrate cracks or holes to displace absorbed moisture. A molecular film is formed which, it is stated, does not dry, become brittle or crack, and insulates metal surfaces from chemical or electro-chemical action that may cause corrosion, although it is not difficult to remove. The liquid will also provide protection for painted surfaces.

The treatment, it is claimed, enables equipment which has been damaged by excessive exposure to moisture, or by total immersion, to be restored to operation.

Non-toxic, stable and inert, the liquid can be applied by brushing or immersion, and is also obtainable in aerosol dispensers for convenient use on production lines.

Equipment for Marking-out Castings and Forgings

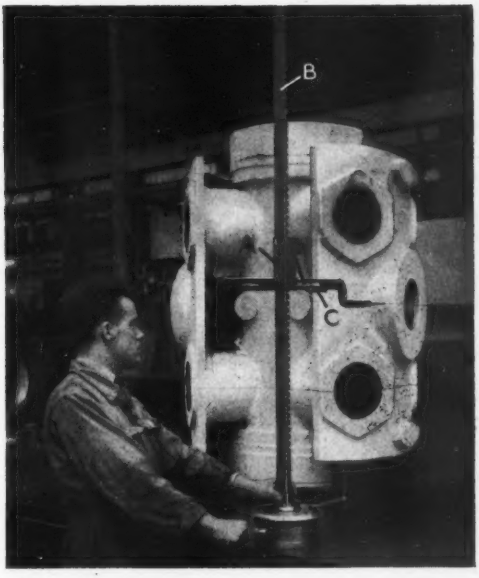


Fig. 1. Special equipment which has been designed and built by Harland & Wolff, Ltd., Belfast, to facilitate marking-out castings and forgings in the company's engine works

TO FACILITATE MARKING-OUT OPERATIONS on castings and forgings at their Queens Island works, Harland & Wolff, Ltd., Belfast, have designed and built special equipment, and a view of the unit for horizontal applications is shown in Fig. 1. A feature of this unit is the speed and ease with which it can be set to the required height, for scribing a number of lines, each of which is at a known distance from a datum, for example.

The scriber is carried at the end of a cranked arm, and the latter is secured to a block *A* which can be raised and lowered on the vertical triangular-section post *B*. This post has a number of square notches in one edge, spaced at 1-in. intervals, and these notches are engaged by a pawl housed within the sliding block. The pawl is engaged with, and withdrawn from, the slots by means of the lever *C*, the travel of which is limited —in the "engaged" position—by a peg projecting from the side of the block *A*. In use, therefore, the gauge is set to the nearest 1 in. of the required dimension by raising or lowering the block *A*, and engaging the pawl with the appropriate notch. Graduations at 1-in. intervals are engraved on the post *B*, and are visible through a small window provided in the block *A*.

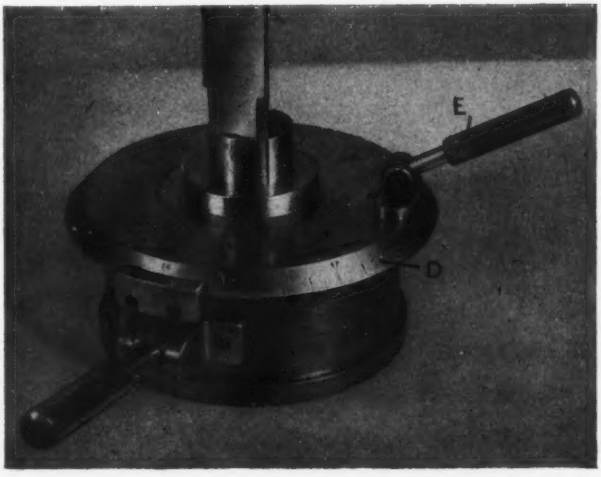


Fig. 2. Close-up view of the base of the marking-out equipment seen in Fig. 1

For setting the remainder of the required dimension, the post is raised and lowered vertically, as a complete unit, by means of a screw arrangement in the base of the stand, and a close-up view of this portion is given in Fig. 2. It will be seen that the lowermost portion of the post is of cylindrical section, and it is a sliding fit in a hole at the centre of the graduated disc *D*. This disc can be turned, by means of the handle *E*, and serves to rotate a nut whereby

the post is raised and lowered vertically. One complete revolution of the disc *D* moves the post vertically through a distance of 1 in., and there are 20 full length divisions equally spaced around the periphery of the disc.

These divisions are widely spaced, and are subdivided by shorter lines, in the conventional manner. It will be appreciated that by turning the disc from one full-length division to an adjacent half-length division, the post is moved vertically through a distance of 0·025 in., and owing to the wide spacing of the divisions, the gauge can readily be set, by interpolation, to within 0·005 in. The handle seen projecting from the base member is used to steady the gauge while the disc *D* is being turned, also to apply a clamp when the post has been set to the required height.

The arm carrying the scriber point, seen in Fig. 1, is also of special design, in that the point is pivoted and can be moved angularly through about 10 deg., for initial setting purposes. This angular movement is effected by means of a small eccentric, which is turned by a knurled-head knob, and there is another, similar, knob which clamps the scriber in the required position after adjustment. With this arrangement, the need to tap the scriber up and down, by hand, to align it with a previously scribed line, for example, is eliminated, and the accuracy and speed with which this operation is carried out are greatly improved.

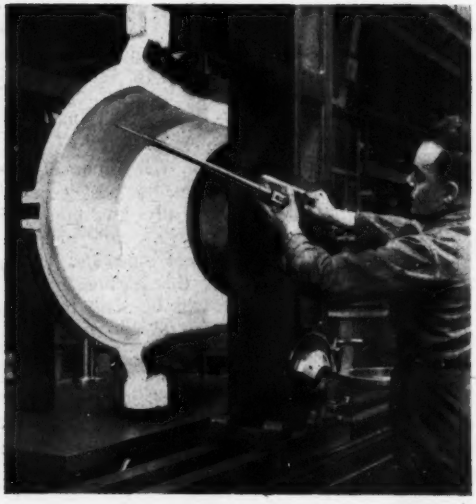


Fig. 3. To facilitate marking out workpieces in the vertical plane, this special trolley-mounted unit has been developed

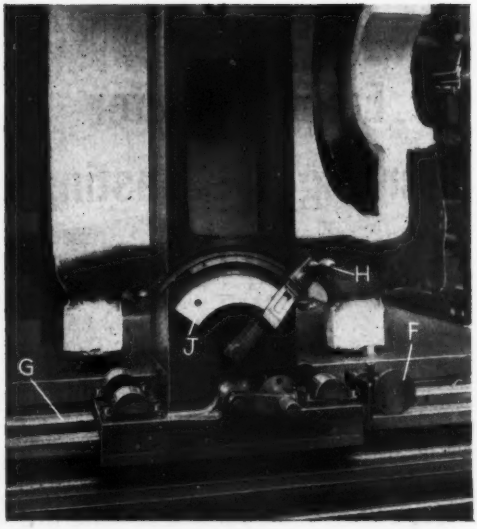


Fig. 4. Close-up view of the roller-type trolley of the unit shown in Fig. 3. Final settings are made by means of the lever *H* with reference to an arcuate scale

MARKING-OUT VERTICAL LINES

The unit which has been developed by the company to facilitate marking out vertical lines is shown in use in Fig. 3, and it incorporates a square-section cast-iron pillar, of ribbed construction, which is secured to a trolley-type base and can be moved on a long, narrow, cast-iron bed. Both sides of the pillar are accurately machined flat and parallel, and serve as vertical surfaces whereon a hand scriber and block can be used, as shown in the figure.

A close-up view of the base of the pillar, showing the trolley whereon it is mounted, is given in Fig. 4. The trolley has four wheels which roll on the flat surfaces of a conventional bed member, and there are orthodox retaining plates which engage with the under-sides of the ways. At the right-hand end of the base there is a plain disc, as indicated at *F*, which is in rolling contact with the bed and serves to drive a drum-type counter. As the unit is pushed along the bed, this counter indicates the distance, in inches, that it has travelled from the datum, and there is another counter which shows the distance travelled in millimetres.

These counters provide a rough guide to the distance moved, but the unit is finally located, to

the nearest whole number, by means of a plunger and the notched bar *G*, which can also be seen in Fig. 3.

Final setting of the unit is effected by means of the lever *H*, which is turned, and set with reference to the arcuate scale *J*. When this lever is turned, a mechanism housed within the base advances the trolley by an amount equal to the reading selected on the scale *J*. The latter has two sets of graduations, one of which reads from 0 to 1 in., in ⅛-in. increments, and the other from 0 to 20 mm., in 1-mm. increments. These graduations are read through a cursor-type window in the lever *H*, and the latter is located in the required angular position by plungers which can be brought into engagement with one of the two notched segments seen above the scale.

The outer segment is used in conjunction with the inch graduations on the scale, and the inner with the millimetre graduations. On the outer segment, there are ten notches in the angular distance subtended by one division on the scale *J*—equivalent to ⅛ in. of movement of the trolley—so the unit can rapidly be set to within 0·012 in. It may be noted that patents are pending on both the marking-out units here described.

Cross Pallet-type Transfer Machine for Operations on Motor-car Steering Gear Housings

The Cross Co., Detroit, Michigan, U.S.A., have recently built the transfer machine shown in Fig. 1 for performing milling, boring, drilling, tapping, deburring, and bush-assembly operations on malleable-iron housings for motor-car power steering gear units.

This machine is of the closed-loop type and the workpieces are located and clamped on circulating pallets. The latter are handled two at a time at each station, and the cycle time is 24 sec. A view of a pallet, with a workpiece secured in position is given in Fig. 2. The casting is clamped from above, by a screw which is applied to a sliding cross-head carrying a fixed and a pivoted pad to ensure a balanced action. This arrangement permits access to four faces of the workpiece, and at two of the machine stations, the pallets are automatically indexed through 90 deg., to enable certain operations to be performed on the side faces of the work. At the loading station, the casting is automatically aligned in the fixture by means of an air-operated pusher, and the screw is tightened by an electrically-powered wrench. When the pallet is transferred to the unloading station, the clamps are automatically released.

The first two machining stations are concerned with rough and finish-milling the pitman cover faces, the vertical spindle heads being equipped with brazed, tungsten-carbide tipped cutters. These cutters are mounted on adjustable adapters,

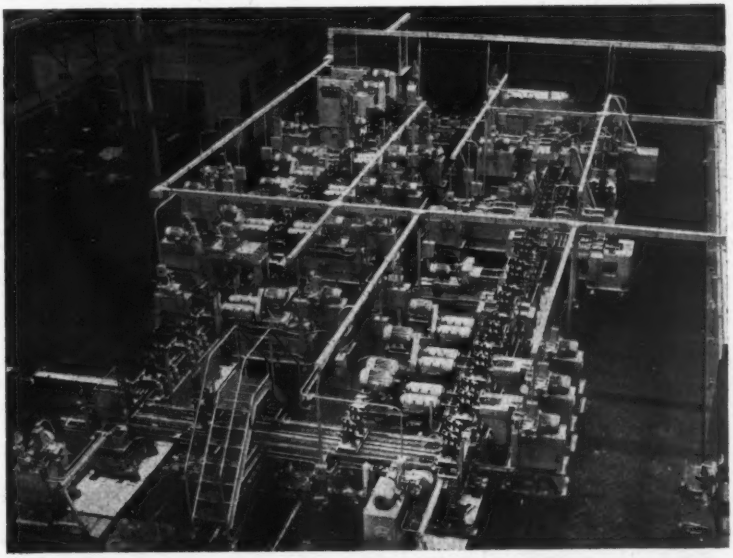


Fig. 1. Cross closed-loop transfer machine for handling power steering gear housings for motor cars

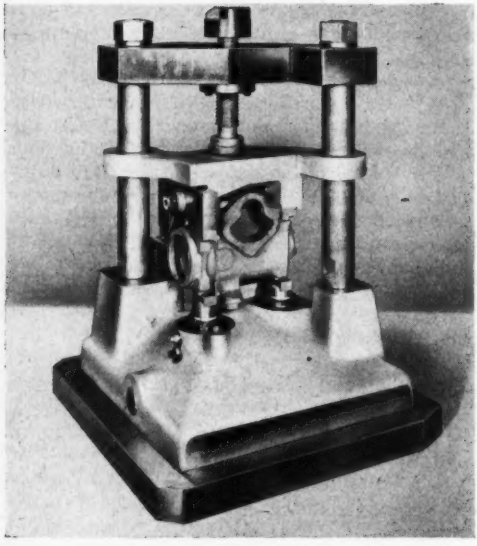


Fig. 2. One of the fixture pallets for the Cross machine, with a workpiece in position

which enable them to be pre-set for cutting size, in a department away from the transfer machine.

Rough and semi-finish boring are next carried out with bars provided with outboard supports, in preparation for finish boring with a standard Cross unit. The pitman and steering shaft holes are bored concentric within 0·004 in. total indicator reading, and to limits of ±0·001 in. on diameter.

BROKEN TOOL DETECTION

At the drilling stations, the drills are monitored by Cross Protect-O-Tool units which are arranged to stop the machine if a drill breaks. At the subsequent tapping operation, after the taps have been withdrawn, the spindle heads are automatically moved longitudinally, and probes, mounted on the same heads, are presented to the holes, to detect the presence of a broken tap. The various internal edges and holes are deburred, mainly by rotating wire brushes which are carried in eccentric housings to provide adjustment for wear.

Gauges are provided at three stations along the machining line for use by patrol inspectors. After all the machining operations have been performed, and before the deburring and assembly stages, the pallets pass to a position from which one or both can be pulled off the transfer conveyor, by an operator, and located at an inspection station as shown in Fig. 3. Here, there are surface plates, a pallet tipping mechanism and various gauges which enable the workpiece to be completely inspected. Provision is made for replacing pallets and workpieces removed from the conveyor, with others that have already been checked, so that no production time is lost.

AUTOMATIC ASSEMBLY

A thrust bearing cup for a worm, and a bush for a pitman shaft, are assembled in each housing after the deburring operation, and Fig. 4 shows the station at which this work is carried out.

Bushes and thrust bearings are fed down chutes from overhead hoppers on the right, and are picked up, in turn, by shouldered assembly mandrels whereby they are automatically pushed into the workpieces.

The latter are supported against the thrust by power-operated mandrels that move forward from the left. If, for any reason, a workpiece is missing from either station, the support mandrel senses the absence of the part, and the assembly mandrel is

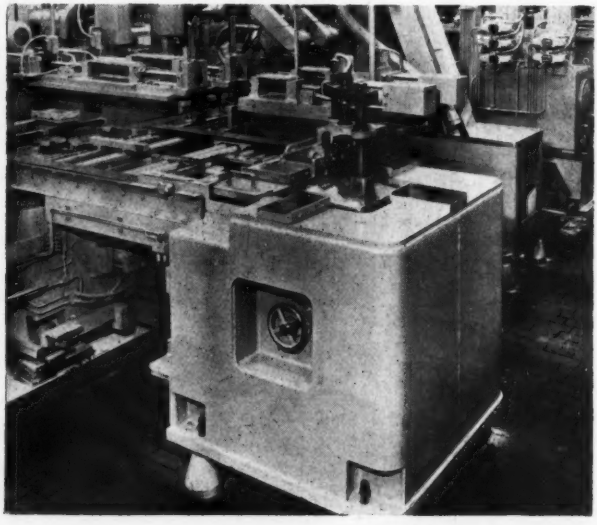


Fig. 3. A pallet which has been withdrawn from the conveyor is here seen at the inspection station

prevented from performing its cycle. In this way, wastage of components is avoided. Since the thrust bearing cups are not symmetrical, they are automatically orientated to face in the correct direction before being delivered to the assembly point. To guard against the possibility of presenting unmachined bushes to the housings, they are checked for diameter before they reach the assembly point.

Capacity has been provided on this machine to enable larger sizes of steering gear housings to be accommodated in the future, if required. Standard Cross units are employed and there are several idle stations that could be tooled-up for any additional operations that may be found necessary at a later date.

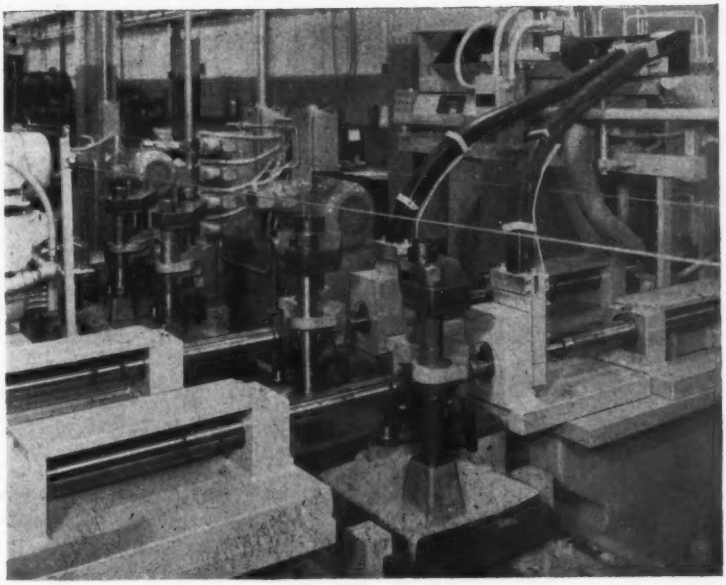


Fig. 4. At this station, the bushes and thrust bearings are assembled, with the castings supported by mandrels which move in from the left

The Cross Co. are represented in Europe by an associate company, Cross International A.G., P.O. Box 300, Fribourg, Switzerland.

Rotary Coolant Filter for 72-in. Aluminium Rolling Mill

A large rotary-type coolant filter has recently been developed for use with the new 72-in. cold mill which is now being installed at the Kitts Green, Birmingham, works of James Booth Aluminium, Ltd. The purpose of the unit is to keep the mill coolant clean, and thus ensure that the rolled products have the required high-quality finish.

The filter unit, which was designed by the Loewy Engineering Co., Ltd., Wallisdown Road, Bournemouth, in conjunction with the company's engineers, was constructed by Windshields of Worcester, Ltd., St. John's Works, Worcester. It measures 12 ft. high, by 10 ft. wide, is more than 20 ft. long, and contains 8,000 gal. of paraffin coolant, the filtration equipment, and two coolant pumps, each with a capacity of 830 gal. per min.

Basically, the unit comprises a large storage tank with a 10-ft. diameter drum, 9 ft. long, mounted transversely across the inside, and free to rotate about a horizontal axis. The outside of the drum is of fine wire mesh, and over it are led two, 50-in. wide, continuous, tensioned webs of filter paper, the feed and take-up mandrels being located above the tank.

Used coolant enters the storage tank through metal filter screens and passes through the filter paper into the centre of the drum. All solids larger than four microns are thus removed, before the coolant is transferred to the pump suction compartment. An automatic system monitors the liquid levels inside and outside the drum, and to compensate for reduced filtration rates, due to the accumulation of sludge on the surface, the dirty side is wound up, and clean paper is fed from the supply reel. The winding mechanism is driven by an air motor.

An agitator unit, oscillated by a geared electric motor and connecting rod, fits closely round the periphery of the drums, to prevent the deposition of sludge on the bottom of the tank. Light alloy extrusions and plate, mainly Duralumin H and MG5, and stainless steel nuts and bolts, were used in the construction of the plant, and with this arrangement, the possible contamination of the coolant by rust is effectively prevented.

K

Fosdick Numerically-controlled Jig Boring Machine

REFERENCE WAS MADE IN MACHINERY, 97/949—26/10/60, to the numerically-controlled Fosmatic jig boring machine displayed by the Fosdick Machine Tool Co., Cincinnati, Ohio, U.S.A., at the Machine Tool Exposition held in Chicago last year, and it was stated that two sizes were available. The machines are designated No. 44P and 54P, and have T-slotted work-tables measuring 44 by 22 in. and 54 by 22 in., respectively. A distance of 27½ in. is obtainable between the spindle nose and the table surface, and the maximum throat depth, which is available for a height of 22 in. above the table, is 25¼ or 30¼ in., according to the size of the machine. The larger type is shown in Fig. 1, in which is also seen the arcuate tool rack referred to in the earlier article. Up to 100 tools can be stored in this rack, and are transferred to and from the spindle, under tape control, by a pivoted arm.

The table and saddle have longitudinal and lateral traverses by hand or power, of 42 and 22 in., or 48 and 28 in., respectively, depending upon the size of the machine, and the counterbalanced spindle head can be adjusted vertically on the column through a distance of 15 in. Each of these slides is mounted on flat ways, and is guided by spaced, inwardly-facing surfaces which form, in combination, a way of truncated V-section, with a small included angle.

Provided with a quick-acting, precision tool-holder at the nose end, the spindle is counter-balanced by a separate system, and runs in matched and pre-loaded, class 9, angular contact bearings. It is housed in a 4⅜-in. diameter hardened alloy steel quill, which is mounted in the head in two re-circulating linear ball bearings and has an axial travel of 9 in. The rack through which movement is applied is attached to the upper end of the quill, to avoid distortion due to thrust from the driving pinion, and the accuracy of the entire assembly is such that spindle run-out at the end of a 12-in. checking bar is guaranteed not to exceed 0·0002 in.

Main drive is taken from a 3-h.p. motor, and 16 spindle speeds from 30 to 1,800 r.p.m. and 8 feed rates from 0·0005 to 0·015 in. per rev. are obtained by means of electro-magnetic clutches in a gearbox. This box is of unit construction, and may be removed without the need for disturbing the remainder of the transmission. In addition, milling feed rates can be obtained for the table and the saddle, also rapid traverse for these members and the quill.

Excluding the tool rack, the machine weighs approximately 9¾ or 10½ tons, according to size, and requires a floor space of 12 ft. square or 13 ft. 4 in. by 13 ft.

Control equipment for automatic positioning is built in, although it may be omitted, if desired, and can then be added at a later date.

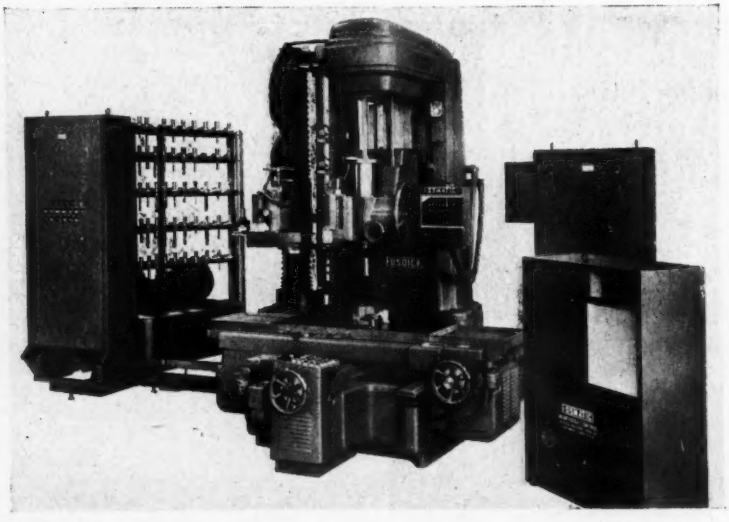


Fig. 1. Up to 100 tools can be stored in the arcuate rack seen at the left of the Fosmatic No. 54 P tape-controlled jig boring machine, and are automatically transferred to and from the spindle by a pivoted arm

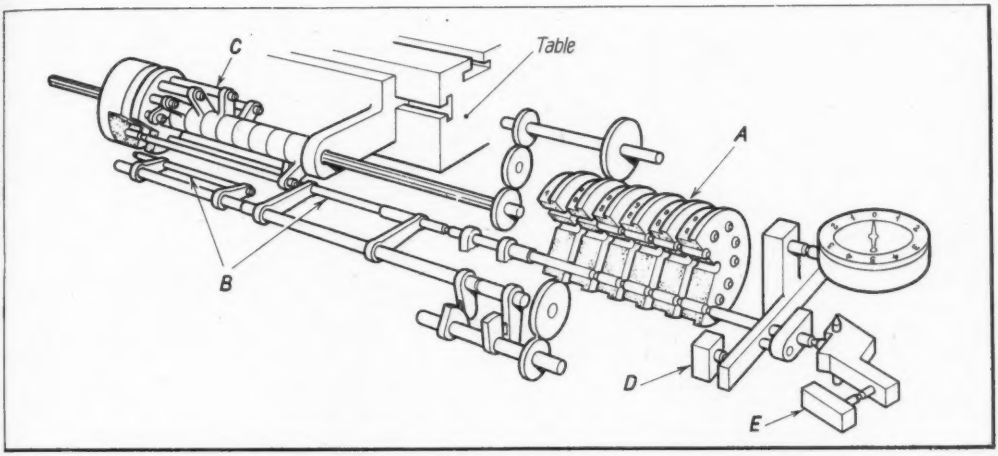


Fig. 2. Diagrammatic illustration of the measuring system for the work-table of the machine shown in Fig. 1, whereby length bars corresponding to the required setting from a zero point are selected by means of dials *A*. Similar systems are provided for positioning the saddle laterally, and for the spindle traverse

The measuring system, and the method by which the table and saddle are traversed to fresh settings, is identical to that provided on manually-controlled Fosdick machines, and there is a set of length bars, made to Class A tolerances, associated with each slide. Positioning is made with reference to a zero point, which may be altered to facilitate setting-up the workpiece, and the required dimensions are selected by means of a series of coaxially-mounted, direct-reading dials. These dials are indicated at *A* in Fig. 2, which is a diagrammatic drawing of the arrangement for measuring in the longitudinal direction.

A number of 10-in. length bars is mounted individually on carriers which are pivoted on a longitudinal shaft, as at *B*, and are swung upwards to the measuring position, as required, by means of the dial at the left-hand end of the series. Movement of this dial is transmitted to a camshaft, and thence through followers which are connected with individual carriers. Bars with lengths that differ by increments of 1 in. provide for obtaining the inch units of the required dimensions, and are housed in the turret *C*, which is attached to the table. This turret is operated by the second dial in the series, motion being transmitted through gearing and a hexagonal shaft. In this way, the required bar is brought into position in line with the previously-selected 10-in. bars. The remaining dials in the series, which provide for obtaining 0·1-, 0·01-, 0·001-, and 0·0001-in. units, house the associated length bars, and the latter are moved directly to the measuring line when adjustments are made. The entire measuring system is totally enclosed, and the bars are chromium plated.

Prior to setting up a dimension, the table is adjusted so that it is farther from the zero point than the required position, thus allowing clearance for the required length bars. After completion of the operation, a push-button is depressed, whereupon the table is traversed towards the zero position at a rapid rate. The stack of bars is closed up during this movement, and eventually operates the limit switch *D* when the table is $\frac{1}{16}$ in. from the final position. Rapid traverse is thereby disengaged, and the remaining movement is made at a slow rate, motion being stopped when the bars operate the limit switch *E*. Finally, the traversing screw is reversed, to release end thrust, and the slide is automatically clamped. A dial gauge, graduated in divisions of 0·0001 in., is provided for checking purposes. Positioning movements of the table and saddle are controlled by separate push-buttons, and may be made simultaneously, if desired.

This system is adapted for numerical control by the addition of electric motors, for turning the selector dials. Drive is taken through gearing, and there is a commutator associated with each dial. A segment of this commutator, corresponding to the required setting, is energized prior to turning the dial, and when it is contacted by a pick-up brush, drive is automatically disengaged by means of a solenoid-operated clutch unit in the transmission.

Vertical movement of the spindle is controlled by a system similar to that employed for table and saddle positioning, and two sets of length bars are provided, for setting the rapid approach distance to 0·010 in., and the feed stroke to 0·0001 in. The system whereby compensation is made for varying tool lengths was described in the earlier article.

Dimensional information is supplied by means of a 1-in., 8-channel punched tape, which is prepared with the aid of Flexowriter or similar unit, and this tape also provides for vertical positioning of the spindle head, and selecting the spindle speed and the feed rate. The tape reader and the information storage system is housed in a separate floor-mounted cabinet, and at the front of this unit there are switches for selecting manual or tape control of the individual functions, also dials whereby dimensional data may be supplied by hand, for transmission electro-mechanically to the measuring system.

Fosdick machines are marketed in this country by Gaston E. Marbaix, Ltd., Devonshire House, Vicarage Crescent, London, S.W.11.

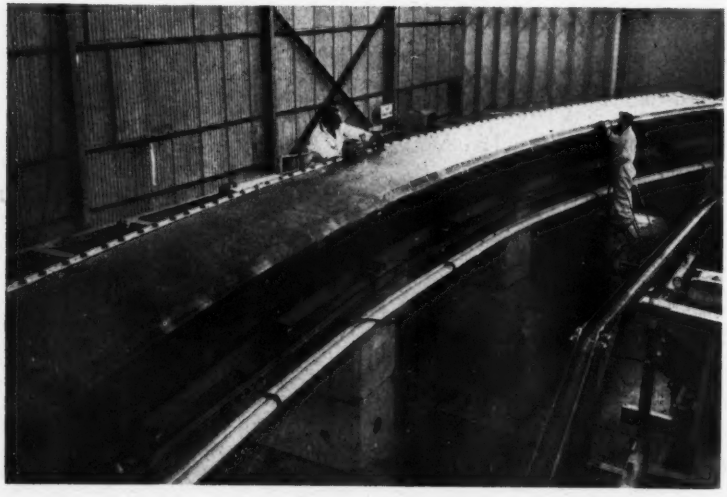
Large Plastics Vacuum Chamber

In the accompanying figure is shown one of a number of arcuate sections which are required for the double-wall vacuum vessel for the Nimrod 7 GeV proton synchrotron now under construction at the Rutherford High Energy Laboratory of the National Institute for Research in Nuclear Science, Harwell.

The vacuum vessel will incorporate outer and inner rings, each composed of eight arcuate portions, and the section shown in the figure is for the outer ring and is 50 ft. long. When the vessel is assembled, it will have a diameter of more than 150 ft.

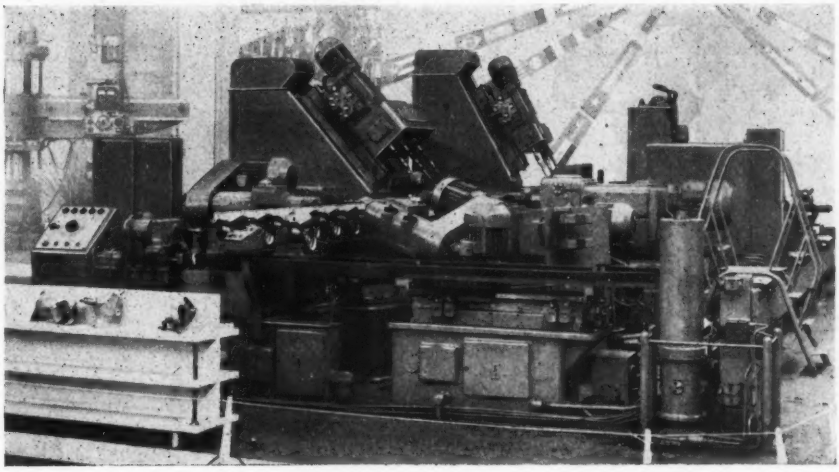
Each arcuate section is made from CIBA Araldite epoxy resin and glass-cloth [CIBA (A.R.L.), Ltd., Duxford, Cambridge] in matched tools, and the section in the figure is claimed to be the largest structure yet made in this manner. The synchrotron, it is stated, will be the first in which laminated plastics have been employed for the vacuum chamber. Considerations which led to the selection of this material included its non-magnetic and non-conducting properties, and high mechanical strength.

The sections are being made by Marston Excelsior, Ltd., Fordhouses, Wolverhampton, and the tolerance on wall thickness for the 50-ft. sections is 0·005 in. In operation, protons will be accelerated through the vacuum vessel to velocities approaching the speed of light.



Made from epoxy resin and glass-cloth, in matched tools, the arcuate section here shown is one of a number which will be assembled to form the vacuum vessel of a 150 ft. synchrotron

CENTRE CUT VICES FOR RAPIDOR MACHINES. Edward G. Herbert, Ltd., Atlas Works, Levenshulme, Manchester, 19, introduced a patented centre-cut vice when the Rapidor Manchester medium duty hack-sawing machine was placed on the market five years ago. Due to the success of this vice, they are making two sizes, one of which can be used on No. 1 and 1A (6- by 6-in. and 8- by 8-in.) machines, and the other on No. 2 and 2A (10- by 10-in. and 12- by 12-in.) machines. With this vice, the saw blade reciprocates through steel-lined slots at the centres of the vice jaws so that both the blank to be cut and the bar stock are held rigidly. It is therefore possible to cut short lengths of material. These are suitable for straight sawing only.



Russian Automatic Transfer Machines at the Leipzig Fair

By R. E. GREEN, Associate Editor

EARLIER ARTICLES in this series on machine tools exhibited by communist countries at the recent Leipzig Spring Fair, have been concerned with the products of the East German factories*, and with standard Russian machine tools† made, for example, by the Ordzonikidze, Krasnoi Proletarii, ENIMS, Dimitrov, Gorki, Kuibyshev, Krasnodar, Stalino, and Odessa plants. Two automatic, in-line, transfer machines, built by the Ordzonikidze machine tool factory, Moscow (MACHINERY, 93/137—16/7/58), for operations on cast aluminium oil filter housings and cast iron main bearing caps for diesel engines, were also shown, and attracted considerable attention.

As in the case of several of the standard machines, these larger units were not for sale but were shown as typical products of the Russian industry. Placed at opposite ends of the large pavilion, the machines were demonstrated in operation for about 5 min. in each hour, and explanatory commentaries in German were then relayed over loudspeakers for the benefit of the large crowds which gathered. The machine for oil filter housings, which operates on a 1 min. cycle time, is here described, and the bearing cap machine will be the subject of a separate article, to be published later.

TRANSFER MACHINE FOR OIL FILTER HOUSINGS

A general view of the machine for oil filter housings—designated type ID 93—from the loading end, is given in the heading illustration, and platen-type fixtures are employed, in which the sand castings are carried to successive stations. A return track for the platens is provided at each end and at the right-hand side of the machine, and unloading and loading are carried out at the same station, so that only one man is required for the operation of the machine. Two finished castings from the machine are shown in Fig. 1, and they are required for diesel engines for vehicles made by the Z. I. Likhachjov Automobile Works, Moscow (MACHINERY, 93/1096—12/11/58), to which the machine will be delivered.

* MACHINERY, 98/939—26/4/61, 98/1006—3/5/61, 98/1074—10/5/61 and 98/1119—17/5/61.
† MACHINERY, 98/1191—24/5/61 and 98/1251—31/5/61.

The castings are of complicated shape, with two rectangular faces measuring approximately 4·12 by 3·25 and 5·75 by 2·5 in., which are disposed at a compound angle to one another. Both these faces require milling, drilling, counterboring and tapping operations, and there is a third, circular, opening, to which the oil filter body is attached in service. This opening has a diameter of about 5·75 in. and a stepped bore for an oil sealing ring of about 4·95 in. diameter is required to be machined, also a central boss which is faced, drilled, counter-bored and tapped. Apart from operations on these faces, several other holes require to be machined in the sides of the casting.

There are six positions at which cutting operations are performed on the machine, usually on more than one casting at a time, and there are 13 unit heads for milling and boring operations, with a total of 35 spindles. The unit heads are from the range of sizes made by the Ordzonikidze factory, and a total of 21 separate motors is employed on the machine, hydraulic pressure being provided by individual floor-mounted units. A continuously-driven, screw-type conveyor extends for the full length of the transfer line, in a trough, and delivers swarf into a container.

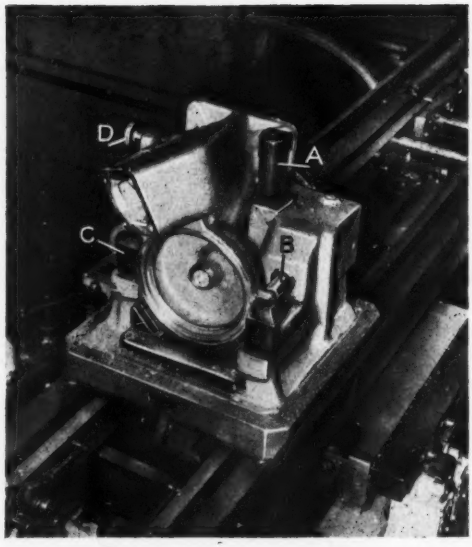


Fig. 2. In the platen fixtures employed on the transfer machine, castings are positioned from the circular housing by V-locations

CLAMPING OPERATIONS

A close-up view of one of the platens—of which there are 41 in all—on the return track, with a finished casting still in position, is given in Fig. 2.

Fig. 1. Views of the oil filter housings for diese engines which are handled on the Russian transfer machine shown in the heading illustration in a cycle time of 1 min.

Of cast construction, the platen has a thick base measuring about 11·75 in. square, with two central T-slots in the under-side, arranged at right-angles, for clamping purposes at the machining stations. In the fixture, the circular housing rests in a V-location with the projecting edge of the larger rectangular flange engaged behind a post *A*, at the top of the fixture. Clamping force is applied to the casting by means of a horizontal screw, turned by a power-driven shaft at the loading station, as shown in Fig. 3.

When it is turned, this shaft moves an elongated plate towards the fixture body, to apply thrust to two horizontal plungers. One of these plungers is seen at *B* in Fig. 2, and it presses against the small cylindrical projection on the side of the circular housing, to clamp it against a fixed abutment on the platen. The second plunger acts in a similar manner, to clamp an angular surface on the casting against the abutment *C*. A knurled-head screw *D*, at the side of the fixture, is then tightened to steady the casting and to reduce vibration

during sequence of machining operations performed.

In Fig. 3, the platen fixture is in the unloading position, at which the sequence of operations just described is performed in reverse. The shaft *E* carries the driving socket which is moved forward into engagement with the teeth of the driven member on the fixture by means of the small hydraulic cylinder *F*. The ram of this cylinder has a slot which is engaged by a lever *G*, secured to the end of a cross-shaft, and this shaft also carries a forked lever, extending upwards. The fork of this second lever engages a groove in the socket shaft, and when the cylinder is energized, the socket is thus moved axially on a splined shaft, into or out of engagement with the fixture coupling.

PLATEN TRANSFER, LOCATING AND CLAMPING ARRANGEMENTS

On the transfer line, each fixture is aligned by means of the central T-slot, which is engaged by a longitudinal tenon between the supporting ways. Transfer is effected by a single long shaft which extends for the length of the machine between the ways, on the left-hand side facing the direction of transfer. Other references, hereafter, will imply this direction, except where stated. Short dowels of about 0·75 in. diameter, projecting from the bar at intervals, engage the cross T-slots in the platens when the bar is turned through 45 deg. Turning is effected by a single hydraulic cylinder, the ram of which is connected by a lever to an axially stationary splined bush on a corresponding portion of the bar.

The bar is moved longitudinally, to transfer the platens from one station to the next, through a distance of about 12 in., by a travelling milling head on the left-hand side of the track. This head is seen at *J* in Fig. 3, and it has a side projection which is connected to the bar. Before the milling traverse of the head—towards the camera—is started, the bar is turned to disengage the dowels. At the end of the milling pass, the bar is turned to re-engage the dowels, and as the head is returned to its starting position, the platens are moved from one station to the next.

Operations on castings are performed on groups of two or three in adjacent platens, so that one unit head, fitted with a suitable adapter, can be employed to full advantage. This arrangement also enables locating and clamping mechanisms for the platens to be operated in groups by single hydraulic cylinders. No other provision is made for the location of the platens at the idle stations apart from the tenon mentioned, but bushed holes of about 1 in. diameter are provided at the corners of the platens, on the under-side, for accurate location at the loading station and those employed for machining.

Two plungers are raised into engagement with the holes in each platen by means of a hydraulic cylinder, acting through linkages and racks and pinions, at each station or group of stations, the cylinder for the plungers at the loading station being seen at *H* in Fig. 3. For clamping the platens there are two T-headed plungers at each machining station, the thin portion of each plunger-head being aligned with the guiding tenon so that the T-slots in the platens engage the heads automatically. When the plungers are

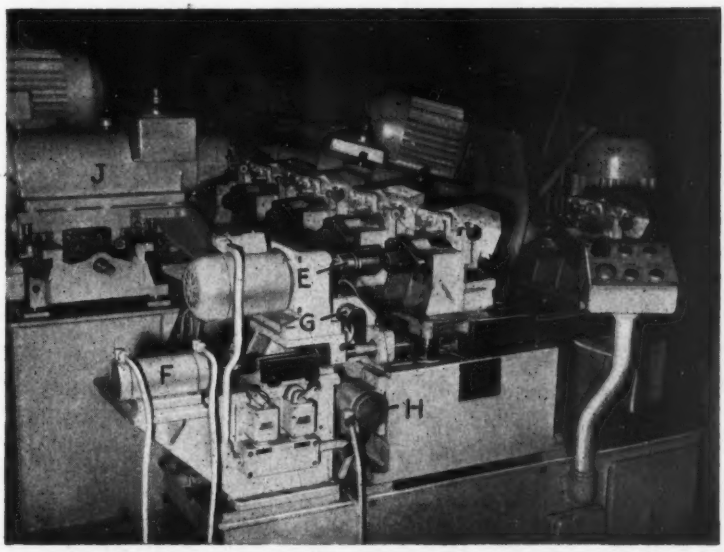


Fig. 3. This close-up view of the loading station shows the automatic unit for tightening and releasing the clamps on the platen fixtures. The hydraulic cylinder *H* raises locating dowels for the platen

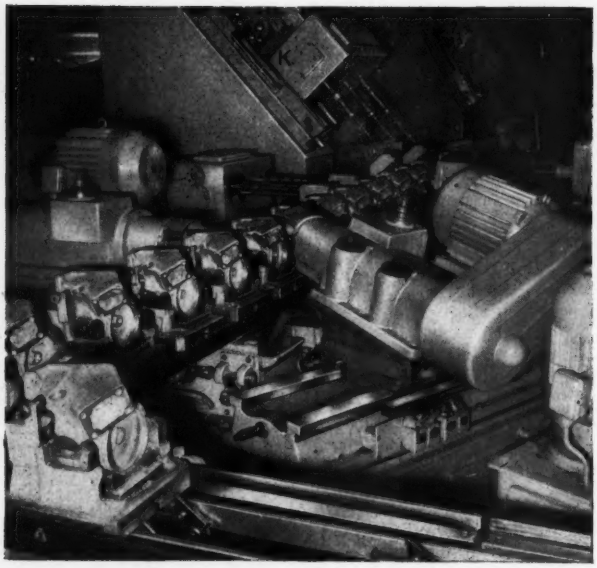


Fig. 4. Face milling operations on the two rectangular faces of the casting are performed at the first machining station. The head at the left also serves to move the transfer bar

moved down by their actuating cylinders, the platens are clamped to the supporting ways.

MACHINING OPERATIONS

Although there was no coolant supply on the machine as demonstrated, a soluble oil emulsion is to be used when it is finally installed, for all but the tapping operations, for which paraffin will be provided. Machining speeds for milling, drilling and tapping are of the order of 1,300 to 1,380, 115 to 130, and 32 to 39 ft. per min. respectively, and the feeds have been calculated to ensure that all operations are completed within the 1 min. cycle time. After leaving the loading position, each platen passes through three idle stations before reaching the first working station, at which the rectangular faces at each side of the casting are machined.

The spindle of the travelling milling head *J*, Fig. 3, is fitted with a face-milling cutter of the inserted-blade type, of about 4·5 in. diameter, with six carbide-tipped inserted blades, which machines the narrower of the two rectangular faces. On the right-hand side of the transfer track, at this position, there is a second milling head, arranged at the required compound angle, as seen in Fig. 4. The spindle of this head is fitted with a cutter of 6 in. diameter, again with six carbide-tipped inserted blades, and the head travels towards the loading position for the milling operation on the angular face.

The heads are of similar, simple design, the spindles being driven directly through multiple V-belts, and each head is mounted on a slide which carries a hydraulic cylinder, the ram being coupled to the stationary base. Movements of the heads are controlled by adjustable dogs at the sides, which operate lever-actuated limit switches on the bases. The compound angle on the side of each casting is obtained by locating the slideway base at the required angle to the transfer track, and inserting a wedge of the appropriate angle between the slide and the spindle head.

Three more idle stations follow, before the platens reach a station at which operations are performed on two castings simultaneously by spindles in common heads, as seen in the background in Fig. 4. The four spindles in the head at the left operate on the narrower rectangular face, three holes of 0·375-in. diameter being drilled near three corners of the face of one casting, and a larger hole, of about 0·45 in. diameter, near the centre of the face of the casting in the adjacent platen. There are two spindles in the head at the right-hand side of the track and while the boss at the centre of the circular housing of one casting is being drilled, the hole in another casting, at the adjacent position, is countersunk.

Of conventional design, each drilling head incorporates a driving motor and a reduction gearbox, carried on a hydraulically-operated slide similar to those for the milling units. On the front face of the gearbox is mounted a multi-spindle adapter, designed to suit the operations to be performed. Provision is made on the side of the gearbox for adjustments to the feed rate, by means of flow-control valves, but spindle speeds cannot normally be changed except by dismantling the unit.

One more idle station follows, and at the next three positions, different castings are machined simultaneously by spindles in common heads at both sides of the track. The spindle head at the left is mounted at an angle, as seen at *K* in Fig. 4, and it

Fig. 5. Taken from a point about one third of the way along the transfer track, this view shows the unit head *M*, which has two drills for operations on castings at adjacent platen positions on the track

has three spindles equipped with drills of successively greater length and smaller diameter, for operations on the off-centre oil-transfer hole *L*, Fig. 1. This hole is drilled right through the casting to communicate with the central boss in the circular housing at the opposite side. At the first two positions, the drills are guided by bushes in brackets secured to the side of the machine bed.

The spindle head on the right-hand side of the track at this position has two spindles which operate on the circular housing. The first spindle is fitted with a cutter head having six inserted blades for facing and boring the large opening. For operations on the central boss of the casting at the adjacent position, the second spindle has a combination tool with sets of four, four, and two inserted blades, designed to face and step-bore the boss in one pass.

Three more idle stations allow space for setters to work on the machine, and are followed by three further positions at which operations are performed, as seen in Fig. 5. At the left there is a head *M* arranged at a compound angle, with two drilling spindles for machining the hole *N*, Fig. 1, which communicates with another hole drilled from the opposite side. This hole, it will be noted, is drilled in stages at adjacent positions. On the right-hand side of the track, the head is also at a compound angle to match the inclination of the rectangular face, and it is equipped with ten spindles which operate on this face. The drills

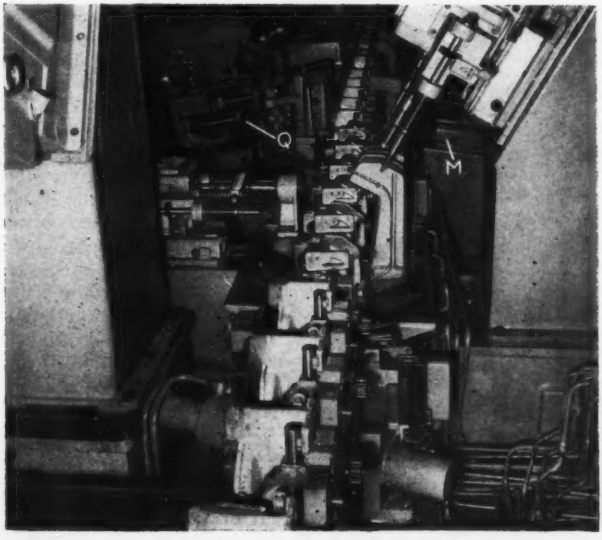


Fig. 6. After passing the station shown in the foreground in Fig. 5, the platens reach a turn-round station where they are swivelled through 90 deg. to enable operations to be performed on the side faces

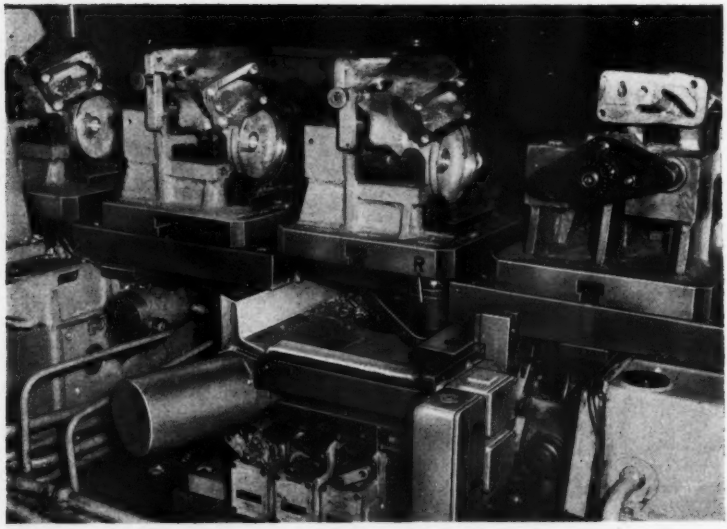


Fig. 7. Close-up view of the turn-round station. A central plunger, with a cross-bar carrying dowel-holders *R*, raises the platen clear of the transfer track and turns it through 90 deg.

carried by these spindles are supported in guide bushes in substantial holders *P*, Fig. 5, which are guided on pillars at each side and are spring-loaded towards the work.

As the head advances, the holders are carried forward almost into contact with the faces to be drilled, until bushed holes in the flanges engage locating dowels on heavy brackets secured to the side of the bed. The bush-holders are thus accurately positioned, relative to the work, before the drilling operations begin. Four of the drills in each group are employed to drill holes of about 0·375 in. diameter near the four corners of the rectangular face in one casting, and to chamfer the holes in the casting at the adjacent position. At the centre of each group there is a fifth drill which is applied to the interior of the rectangular housing, to machine the hole communicating with that indicated at *N* in Fig. 1. This drilling operation is completed in stages at adjacent work positions, and the movements of the heads are so timed that the drills do not interfere on breaking through.

At the far side of the head there is a bracket carrying four probes which are spring-loaded towards the casting at the next position along the line. This bracket is seen at *Q* in the view looking in the opposite direction along the transfer track seen in Fig. 6, and the four probes which it carries enter the holes which are drilled and chamfered at the previous stations. Should these probes be prevented from entering because a drill has broken or a hole has not been machined to depth, a limit switch is operated and the machine cycle is interrupted. A lamp is then lit to indicate the position at which adjustment or tool changing is required.

TURN-ROUND TABLE

After passing the proble unit, the platen moves through an idle station before reaching a position at which it is turned through 90 deg. about a vertical axis, in a clockwise direction, as viewed from above.

A close-up view of this unit, from the left-hand side of the track, after the completion of the turning cycle, is given in Fig. 7. At the turning station, the platen rests on a portion of the support track which is narrower than the remainder. Beneath the track there is a cast housing with a central vertical plunger carrying a cross-bar. At each end, this bar has a cylindrical projection *R* which houses a dowel of the same diameter as those employed for location purposes.

A hydraulically-operated mechanism within the housing is designed to raise and lower the central plunger, and when it is raised, the dowels enter the locating holes in the corners of the platen. Further upward movement then lifts the platen clear of the transfer track, and the plunger is next rotated through 90 deg. by a hydraulically-operated rack and pinion arrangement, to turn the platen to the position shown. The plunger is now lowered, to deposit the platen on the transfer track with the second T-slot engaged with the line tenon, and the dowels are withdrawn from the locating holes. Finally, the plunger is returned to its original angular position, ready for the next turning cycle.

Automatic turning, which is completed within the machining portion of the cycle, after the return of the transfer bar, is controlled by means of limit switches on the outside of the housing, whereby solenoid valves in the hydraulic circuit are operated. The limit switches are actuated by means of stops on slides which are connected to, and moved

by, the raising, lowering and turning mechanisms within the housing. Another idle station follows the turn-round position, as seen at the left in Fig. 7, and the platens are next advanced to the machining stations seen in the foreground in Fig. 6.

Castings at the next two operating stations are machined by heads at each side of the track, the head at the right in Fig. 6 (on the left facing in the direction of transfer), being provided with two spindles equipped for successive drilling and spot-facing operations. The head is mounted in a nearly vertical position, and operates on the hole *S*, Fig. 1, near one corner of the casting, to drill and spot-face diameters of approximately 0·56 and 1·56 in. diameter. At the near side of the head there is a probe which enters this hole when the casting is moved to the next station to check that it has been drilled to depth in readiness for the subsequent tapping operation.

The head at the left in Fig. 6 is employed to drill the boss *T*, Fig. 1, on the side of the circular housing, and it also carries a probe which enters this hole at the next station to check that it is clear for tapping. Following these three stations there is again an idle position before the platen reaches a second turn-round station, of similar design to that shown in Fig. 7. Here, the original orientation of the platen is restored, and it then proceeds through another idle position to the station in the immediate foreground in Fig. 6.

LATERAL TAPPING STATION

In this position, the platen is aligned with the lateral transfer ways seen at the left in Fig. 6, which lead to a tapping station located some 6 ft. from the main transfer track, as shown in Fig. 8. The arrangement of the tapping station remote from the remainder of machine has the advantages that a different lubricant for the taps can be employed. Moreover, the tapping heads can be grouped round the casting so that all the holes are threaded at a single operation. At the position on the main track from which the platen is moved to the tapping station, the main tenon is replaced by projections from a slide between the ways of the lateral track.

This slide is coupled, by means of two cylindrical bars, to another slide on ways to the right of the main track, as viewed in Fig. 6, in line with the lateral track. The second slide carries a rack with vertical teeth and there is a similar rack secured to the base member. Meshing with both these racks is a pinion, mounted on a vertical shaft on a smaller slide which is connected to the ram of a hydraulic cylinder between the ways. With this arrangement, the movement of the pinion is amplified so that both the stroke and the speed of movement of the ram are doubled.

The platen is pushed along the lateral ways to the tapping station, being guided by a tenon which engages the transverse T-slot in the under-side. At the tapping station, this slot is moved into engagement with T-headed clamping plungers which are pulled down to secure the platen in position, after the locating holes have been engaged by rising dowels, as on the main track. Each of the tapping heads seen in Fig. 8 operates on an automatic cycle which is initiated as soon as the clamps have been applied to the platen, and is advanced under lead-screw control. Holes tapped at this station include the four at the corners of the wider rectangular face, those in the central and side bosses of the circular housing, and that indicated at *S* in Fig. 1.

Fig. 8. With the platen moved out from the main transfer track along a lateral track, tapping in four directions is carried out simultaneously

L2

Fig. 9. After returning to the main track, the tapped casting enters this station at which it is raised into a sheet metal housing to be washed and vibrated for swarf removal before passing on to the return track seen in the foreground

At the end of the tapping movement, the spindle and leadscrew of each head are reversed by the action of a switch within the head, actuated by a stop disc geared to the spindle, and the head automatically withdraws. When the locating dowels have been retracted and the clamps released, the direction of the oil supply to the slide-actuating cylinder is reversed to move the platen back to its original position in the line. The complete cycle of movements of the platen to and from the tapping station, and the tapping operations, are carried out during the 1 min. cycle time of the machine. From the line position opposite the tapping station, the platen is passed through two idle stations before moving into the pick-up position for a chip-dumping unit at the left-hand side of the track, as seen in Fig. 9.

CHIP-DUMPING AND PLATEN-RETURN ARRANGEMENTS

At this position, the platen is moved into engagement with grooves at the lower ends of two inverted U-shaped arms which are connected by cross-bars to form a frame. The arms are carried on a shaft at the side of the track which can be turned by means of a rack and pinion, actuated by a hydraulic cylinder. When the shaft is thus turned, the platen is lifted in an arc into a sheet metal housing at the side of the track, where it is subjected to the washing action of sprays of coolant in the completed installation. In the raised position, the frame is turned through an angle of about 110 deg. and it rests against stops within the housing.

Beneath the position occupied by the frame there is a second hydraulic cylinder, the ram of which is connected to a bell-crank lever. This cylinder is so arranged that the ram can be reciprocated automatically, and the other end of the bell-crank lever is thus brought into contact with the frame. A series of rapid blows is thus imparted to the frame during a period of about 2 sec., and the swarf dislodged is then washed into the trough of the swarf conveyor, seen beneath the unit in Fig. 9, which discharges at this end of the machine. The platen is next returned to the transfer track and three successive indexing movements brings it on to the first portion of the return track, in the foreground in Fig. 9.

This return track has supporting surfaces of the same width as the platen, and raised strips at each side for guidance. Between the supporting tracks is the transfer mechanism which incorporates two rectangular-section bars spaced about 8 in. apart. These bars are held on slides which are similar to those for the transfer mechanism serving the tapping station, and each bar carries a number of spring-loaded pawls. The pawls are pushed down by the platens during the return movement of the transfer bars, and rise again on the opposite sides. When the bars are again moved forward, therefore, the platens are indexed along the conveyor tracks.

The transfer cylinder is continuously actuated until the platen reaches a position near the end of the return track, where it operates a limit switch. This position is shown in Fig. 10, and it will be observed that the first portion of the return track leads to a platform *V*. This platform is secured to the side of a large hydraulic cylinder *W*, which can be moved vertically on its fixed ram, and with the cylinder in the raised position, the platen is moved on to the platform at the next indexing movement of the return transfer mechanism. The platform has a slot in the under-side, and when it is subsequently lowered, the slot straddles a con-

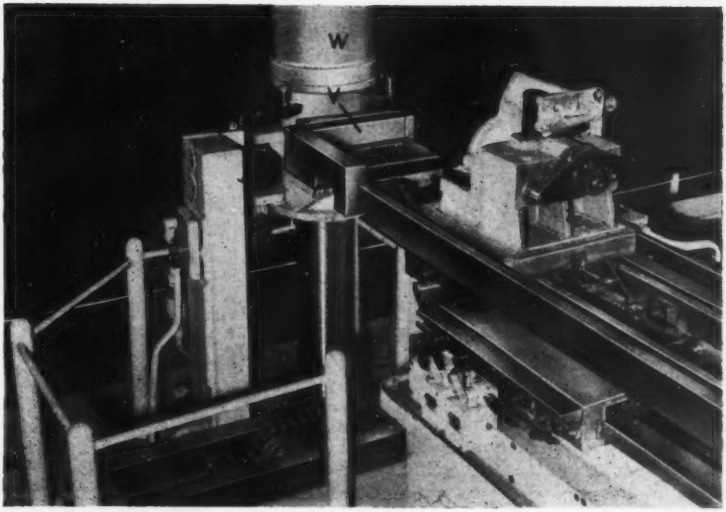


Fig. 10. At the end of the first leg of the return track, the platen is lowered by this hydraulic lift to a floor-level conveyor on which it returns to the loading station

tinuous roller chain extending along the portion of the return track which is parallel to the main transfer track of the machine, and at floor level.

The chain is driven intermittently by a motor at one end of the track, and it carries pawls which push the platen along until it eventually reaches a similar elevating platform near the loading end of the machine, as seen at the right in the heading illustration. This platform is so designed that the transfer bars of the end track, which is of similar design to that at the unloading end of the machine, can pass through slots to a position at which the transfer pawls can engage the platen and withdraw it. The platen is then indexed to the position where it is unloaded and re-loaded. Because of the difficulties of transport, the machine was demonstrated at Leipzig by re-cycling the castings continuously.

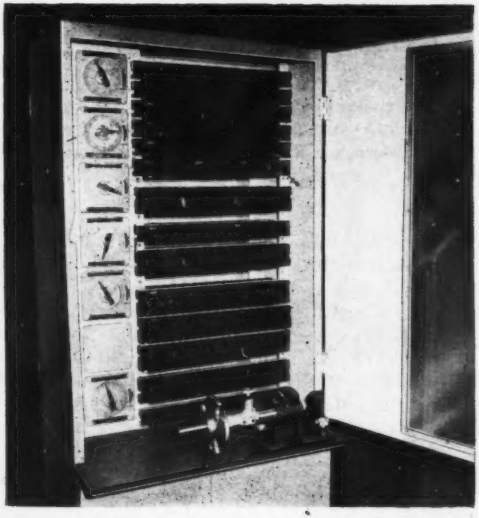


Fig. 11. Control of tool life for each station is obtained by means of dials in this cabinet, with pointers which are moved at each machine cycle. Provision is made for storing a spare set of tools, and for pre-setting them in their holders

Clamping and unclamping, and starting and stopping of the machine cycle are effected by means of push-buttons at the right of the loading station in Fig. 3, and the machine can also be manually controlled by means of a multi-position rotary selector switch on a separate panel, seen at the extreme left in the heading illustration. Behind this panel there is a cabinet containing the tool control equipment, with a glass-panelled door which is normally closed and locked. A view showing the equipment within this cabinet is given in Fig. 11, and it will be noted that there are six dials, each with two pointers.

Dials of two different types are provided, graduated in numbers from 0 to 2,400 and 0 to 10,000, to suit the particular operation to be recorded, and each dial relates to one of the machining stations of the transfer line. One of the pointers is set to the number of cycles which a set of tools will complete before it requires to be changed, this number varying according to the nature of the work performed. The other pointer is aligned with the fixed pointer when new tools are fitted, and at each machine cycle it is indexed towards the zero point. When zero is reached the machine stops automatically, and a lamp is illuminated to show that a tooling change is required.

To the right of each dial, there are wooden bars with holes to suit the shank diameters of the tools, to accommodate a complete spare set. A setting jig, as shown on the shelf beneath, is also provided, to enable the tools to be pre-set for length in their holders, before they are fitted to the machine spindles.

Use of Noral 28S Alloy for Lens Mounts

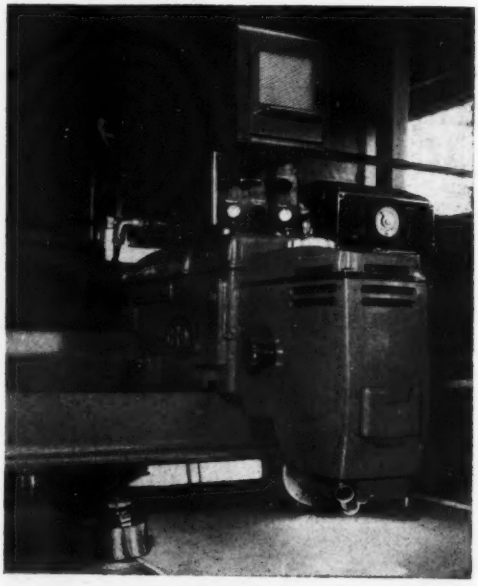
Various photographic and television lens mounting components, examples of which are shown in the figure, are now being produced by Taylor, Taylor & Hobson, Leicester, from Noral 28S aluminium alloy supplied by Alcan Industries, Ltd., Banbury. Machining properties of this alloy, it is stated, compare favourably with those of free-cutting brass. There is no build-up of metal on cutting edges, and long, continuous strands of swarf are not produced. In addition, the alloy has the advantages of being considerably lighter and cheaper than brass. It is normally supplied in the form of bar in sizes up to about 4 in. diameter, but is also available in the form of drawn wire, tubing, and simple extruded sections.

Noral 28S can be readily treated to produce a corrosion-resistant anodic film which will absorb dyes. For lens mounts, the film is dyed black prior to the application of matt black enamel on all internal surfaces. It is thus ensured that a bright metal surface is not exposed should the enamelled coating be damaged in service. External surfaces of the lens mounts are frequently coated with synthetic resin lacquer.

Examples of lens mounting components produced from Noral 28S aluminium alloy

B.O.C. Automatic Line Following Unit

British Oxygen Co., Ltd., Bridgewater House, St. James's, London, S.W.1, have introduced a new automatic line-following unit for profile flame cutting, which enables burner head movements to be controlled from a line drawing prepared in pencil or ink, for cutting shapes from steel plates. A B.O.C. Bison oxygen profiling machine fitted with the new unit, as shown in the illustration, was demonstrated on the company's stand at the recent Engineering, Marine, Welding and Nuclear Energy Exhibition.



The new B.O.C. automatic line-following unit is here shown mounted on a Bison profile cutting machine. Automatic compensation for kerf width is provided, and printed circuits and transistors are employed in the control system

Settings can be made with the aid of a dial to give automatic compensation for kerf width, and components can be cut from plates of any thickness within the capacity of the machine, from the same drawing. The unit incorporates an optical scanning head, which has a non-vibratory photo-transistor cell. Printed circuits and transistors are employed in the control system, which provides for comprehensive electronic interlocking.

Production of Components for Compressed Air Equipment

Some Interesting Set-ups at the Farnham Works of Martonair, Ltd. and Nuquip, Ltd.

By G. W. MASON, Associate Editor

AT THE FARNHAM WORKS of Martonair, Ltd., Richmond, and Nuquip, Ltd., machines built by the company have been installed for the quantity production of component parts for their range of air cylinders, and for performing operations on heads for lubricators which are incorporated in compressed air lines.

The machine shown in Fig. 1 is employed for drilling intersecting stepped-diameter holes in one end face and an edge of the end covers for a 2½-in. diameter air cylinder. Machined from hot brass pressings, the 2$\frac{15}{16}$-in. square end covers have an overall thickness of 1¼ in., and the holes, which are indicated at *A* and *B* in the sectional view, Fig. 2, serve to restrict the flow of air discharged from the cylinder during the final part of the working stroke, so that a cushioning action is obtained. In the final assembly, the tapped central portion of the hole *A* is fitted with a needle valve that is threaded 4 B.A., and enables the rate at which air is discharged from the cylinder during the final part of the piston travel to be varied. For most of the working stroke, air is discharged from the cylinder by way of the $\frac{3}{16}$-in. diameter hole *C*, but during the final part of the movement, an enlarged-diameter portion on the piston rod enters the 1$\frac{3}{16}$-in. diameter bore in the end cover. Air in the space between the opposing faces of the piston and the end cover is then admitted to the hole *C* by way of the holes *A* and *B*.

Referring again to Fig. 1, end covers are stacked, as indicated at *D*, between two pieces of angle iron which form a magazine at the right-hand end of the machine. At each working cycle, which occupies about 20 sec., the lowest component in the stack is moved to the left, on a pair of guide rails in the tunnel-shaped drilling fixture *E*, by a pusher bar operated by a horizontally-mounted air cylinder, and is thus brought to the first drilling position. At the same time, partly completed components in the fixture are advanced for a distance which corresponds to their width. In this way, alternate end covers are brought into line with the drilling spindles at each movement of the pusher bar.

End covers at the drilling stations are simultaneously located and clamped by cone-ended pins attached to steel plates, which are moved downwards (into engagement with tie-rod holes drilled in the components at a previous operation) by the action of four air cylinders, flange-mounted on top of the fixture. At the first three working stations, different operations are performed for drilling the stepped-diameter hole *A* in the edge of each end

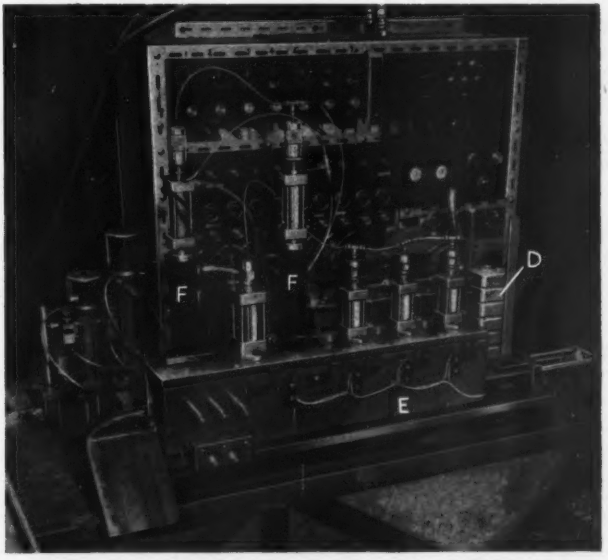


Fig. 1. This machine has been built by Martonair, Ltd., for drilling intersecting, stepped-diameter, holes in end covers for air cylinders, on a fully-automatic cycle

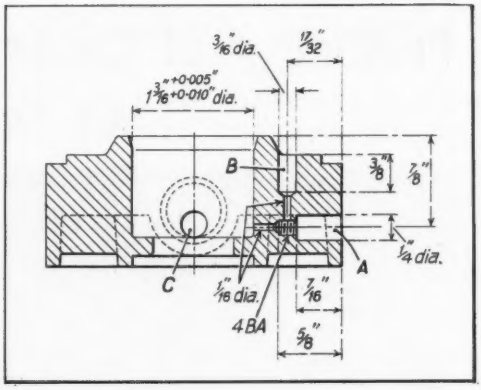


Fig. 2. Sectional view of an end cover for a Martonair air cylinder. The stepped-diameter holes indicated at *A* and *B* are drilled on the special-purpose machine shown in Fig. 1 in a cycle time of about 20 sec.

cover, by horizontal spindles at the rear of the fixture, which are driven by V-belts and pulleys from an electric motor. The stepped-diameter hole *B* is drilled in the end surface of the cover, at two operations, by the vertically mounted units *F*, the spindles of which are driven by Desoutter air motors. Feed and rapid traverse motions for all the drilling spindles are provided by air-hydraulic cylinders. When the drilling operations have been completed, the cover is pushed clear of the left-hand end of the fixture, and is discharged from the machine down an inclined chute, by the action of loading another component at the right-hand end.

The various motions of the machine are interlocked by a separate low-pressure air system. For this purpose, air at about 10 lb. per sq. in. pressure is delivered to units on top of the clamping cylinders, and through holes in metal plates which serve as stops for controlling, positively, the working strokes of the drilling spindles. When the workpieces have been clamped, all the inlet ports for the delivery of low-pressure air to the units are obstructed by extension pieces on the piston rods for the clamping cylinders, and the resulting build up of pressure in the system operates a diaphragm valve which initiates the drilling operation. At the end of the drilling stroke, seating plates on the spindles make contact with the stops, and, at the same time, obstruct the holes to prevent the escape of air. When all the holes have been closed in this way, pressure in the system again builds up to operate another valve incorporated in the circuit, which is arranged to initiate the return travel of the spindles.

Other machines of generally similar design are employed at the Farnham works for performing various drilling operations on end covers for different sizes of air cylinders.

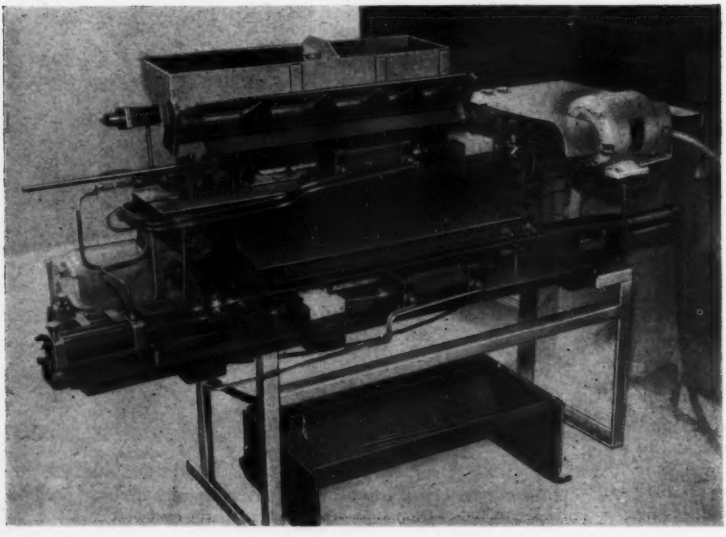


Fig. 3. Tie rods for air cylinders are chamfered at both ends, in preparation for threading, in a fully-automatic continuous cycle on this machine

CHAMFERING AND THREADING OPERATIONS ON TIE RODS

In Fig. 3 is shown a machine which has been built by the company for chamfering both ends of tie rods for air cylinders on a continuous fully-automatic cycle, and a close-up view is given in Fig. 4. Tie

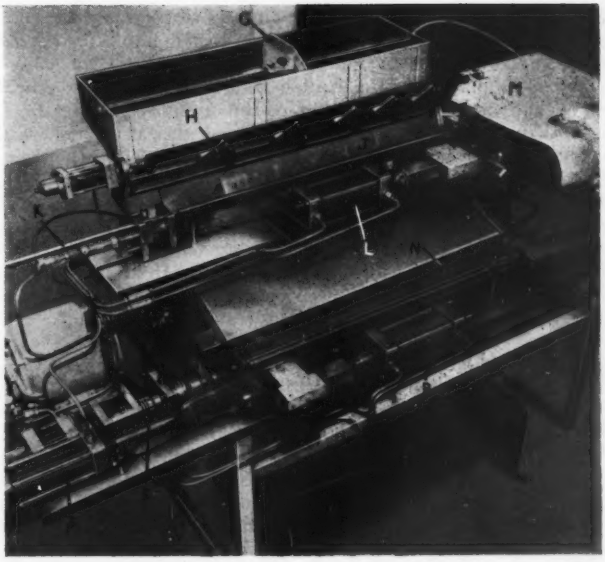


Fig. 4. Close-up view of the chamfering machine for tie rods shown in Fig. 3

rods to be chamfered, which may have diameters from ¼ to ⅜ in., and lengths from 4 to 22 in., are loaded into a hopper on top of the machine, at the right-hand side of the adjustable stop plate *G*. The rods then pass down a short chute at the bottom of the hopper, and are held at the lower end of this chute by projections at the right-hand ends of two or more of five swivel stops, one of which is indicated at *H*. These stops are connected to each other by a horizontal bar, and at each working cycle they are swivelled simultaneously by a short-stroke air cylinder at the left-hand end of the machine. As a result, the leading tie rod falls into the V-shaped trough *J*, but the remaining rods are held by projections at the left-hand end of the stops *H*. The stops are then returned to their original positions, and the projections prevent another tie rod from falling into the trough *J* during this movement.

A pusher bar, indicated at *K*, which can be adjusted in an axial direction to suit the length of the tie rods to be chamfered, is now traversed to the right by another air cylinder to move the rod in the trough into contact with a swing-type end stop. Next, the tie rod is held by gripper jaws, which are closed by means of a wedge, operated by the air cylinder *L*. At the same time, the stop is swung upwards clear of the work. A motor-driven spindle, fitted with a shell-type cutter, which is mounted beneath the cover plate *M*, is now advanced by a fourth air cylinder to perform the chamfering operation on the right-hand end of the tie rod. When the cutter spindle has been returned to its original position, and the gripper jaws have been opened, a plate which forms the bottom of the trough *J* is swung clear by an air cylinder at the rear of the machine, and the tie rod falls on to an inclined sheet metal guide, to be directed into a second

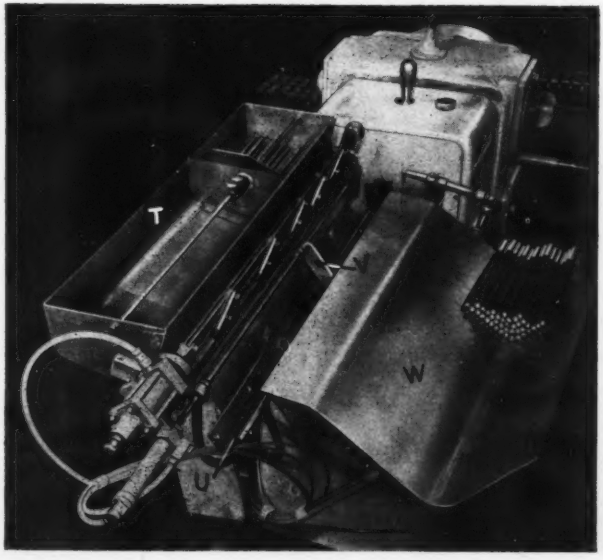


Fig. 5. When chamfering has been completed, threads are cut on both ends of the tie rods on this Edgwick machine, which has been fitted with work handling equipment and converted for fully-automatic operation by Martonair, Ltd.

trough indicated at *N*. Thereupon, the stops *H* are swivelled to allow another tie bar to fall into the trough *J*.

A pusher plate, which can slide on a cylindrical guide bar attached to the front of the trough *N*, is now moved to the left by means of the air cylinder *P*, to bring the non-chamfered end of the first tie bar into contact with a second swing stop. Next, the pusher plate is returned to its starting position by another air cylinder at the right-hand end of the machine. The pusher plate is attached to a steel cable, which extends in front of the machine, and passes round a pair of rollers at each end. The outer roller of each pair is mounted in a forked end piece attached to the piston rod of one of the air cylinders, and with this arrangement, the pusher plate can be traversed for the full length of the trough *N*, if required, by a fairly short movement of the piston.

As soon as the tie rod has been brought into contact with the swing stop, a second pair of gripper jaws is closed by the action of another wedge operated by the air cylinder *R*. Next, the motor-driven cutter spindle *S* is advanced, again by an air cylinder, to chamfer the left-hand end of the tie rod, and during the first part of its travel, a plate-type cam attached to a moving part of the spindle housing causes the swing stop to be brought clear. When the spindle *S* has been returned to its starting position, another plate, which forms the bottom of the trough *N*, is swung clear, and the chamfered tie rod falls into a container that rests on the shop floor beneath the machine.

Following chamfering, screw threads are cut on both ends of the tie rods at separate operations, on an Edgwick (Alfred Herbert, Ltd.) threading machine, which has been fitted with work-handling equipment, and converted by the company for operation on a fully-automatic cycle. A close-up view of this machine showing the work-handling equipment is given in Fig. 5. From the hopper *T*, tie rods are released into the trough *U*, one at a time, at each working cycle, by way of two or more of five swivel stops, which are of similar design to those seen at *H* in Fig. 4. When a tie rod has been loaded into the trough *U*, the pusher arm *V* is swung downwards to the position shown, and then advanced to pass the rod between the jaws of the work-holding vice. The cylindrical bar which carries the pusher arm is moved in an axial direction by an air cylinder, and the swivelling motion is obtained from a twisted, square-section end piece, which passes through a support bracket attached to the hopper at the end nearer to the die head on the machine.

As soon as the pusher arm has been brought to the end of its stroke, the vice jaws are closed by the action of another air cylinder, and the arm is then swung clear. The handwheel normally provided on the machine for traversing the slide for the vice on the bedways, has been removed, and the pinion shaft is now turned by a third air cylinder, through an arrangement of links, to feed the tie rod into the die head. When the vice jaws have been opened at the end of the return travel of the slide, following the screw-cutting operation, the trough *U*, which is carried on a pair of arms, is swung upwards by another air cylinder, and the tie bar is discharged on to the steel plate *W*.

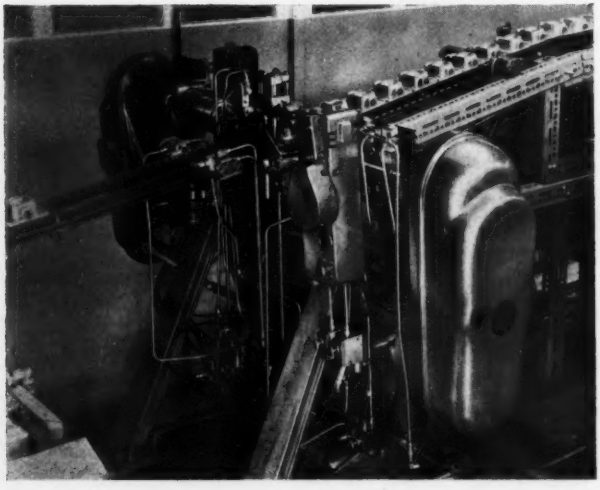


Fig. 6. A 2-spindle fully-automatic machine for tapping cored holes, to receive hose connectors, in pressure die cast heads for Nuquip lubricators

OPERATIONS ON LUBRICATOR HEADS

Heads for lubricators for compressed air lines, made by Nuquip, Ltd., are pressure die cast in brass, and at the first stage in the sequence of machining operations, co-axial cored holes at opposite sides of each component are tapped, to take connecting pieces for hoses, on the 2-spindle machine shown in Fig. 6. This operation is completed in a

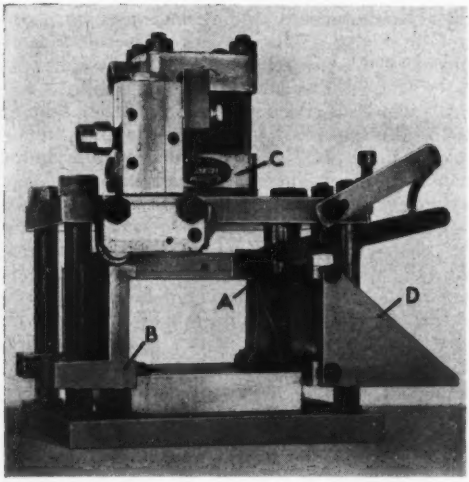


Fig. 7. One of the interchangeable fixtures employed on the machine shown in Fig. 6 for holding lubricator heads while tapping is in progress

cycle time of 25 sec., and the holes are not drilled prior to tapping.

The machine incorporates two Pacera (W. J. Meddings, Ltd.) drilling heads, fitted with Autal [Optical-Mechanical (Instruments), Ltd.] tapping chucks, which are mounted at the ends of a large-diameter horizontal bar carried by two A-shaped castings. Mounted on the bar between the castings there is a platform to take interchangeable work-holding fixtures for two sizes of die castings, in one of which holes are tapped ½ in. B.S.P., and in the other, ¼ in. B.S.P. Inclined chutes at both sides of the machine comprise angle iron side pieces fitted with closely-spaced ball bearings which ensure that the die castings can move easily when they are being loaded into and discharged from the fixture.

Die castings to be tapped are loaded on to the chute at the right-hand side of the machine, which is supported by a framework built up from slotted angle sections, and they are moved by gravity to bring the leading component into contact with a trigger stop incorporated in the fixture. Fig. 7 shows the fixture for tapping the larger die casting, and the trigger stop is indicated at *A*. The die casting is then supported at the sides by shoulders on the inverted channel-shaped member *B*, which can slide on vertical guide bars on the fixture, and is attached to the piston rod of the air cylinder *C*. The air cylinder is now brought into operation, for clamping the die casting between the top plate of the member *B* and another plate mounted on the base of the fixture. At the same time, two of four tie-rod holes cored in the die casting pass over pins in the lower plate, for locating the component for the tapping operation. During the clamping sequence, the die casting is brought clear of the trigger stop *A*, which is then moved sideways by spring action, riding on the top surface of the component, and the triangular

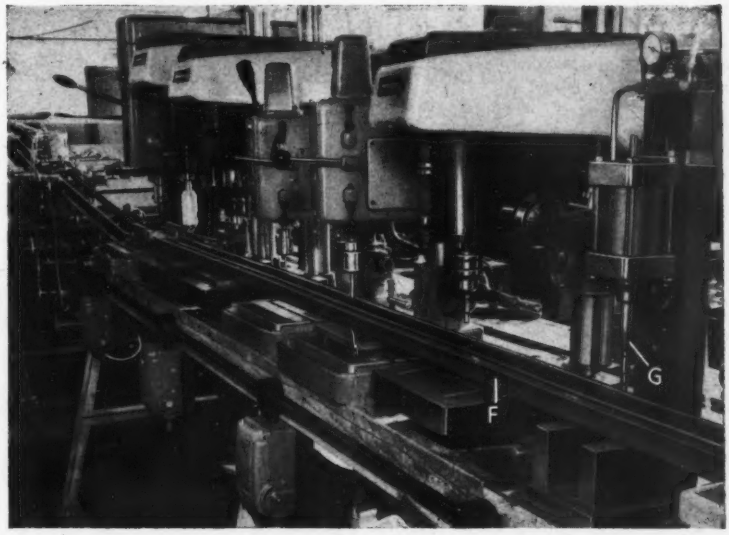


Fig. 8. When the holes for connecting pieces have been tapped, lubricator heads are passed to each of these bench-mounted drilling machines, in turn, by way of cylindrical guide bars in the channel-shaped support member *F*, for other operations

plate *D* operates a roller-type air valve to start the tapping cycle.

The tapping spindles are advanced towards the work by tne action of Martonair feed units mounted on the Pacera heads, one of which may be seen at *E* in Fig. 6. This unit comprises, essentially, a double-acting air cylinder with rack teeth cut in the piston rod, which mesh with a hollow pinion, the latter being mounted on the pinion shaft normally provided on the Pacera head. At the end of the tapping stroke, other roller-type valves are operated by stops on the spindle heads, to reverse the feed units for withdrawing the taps from the work. When the spindles have been brought to the ends of their return strokes, another pair of valves is operated to reverse the clamping cylinder on the fixture for releasing the component.

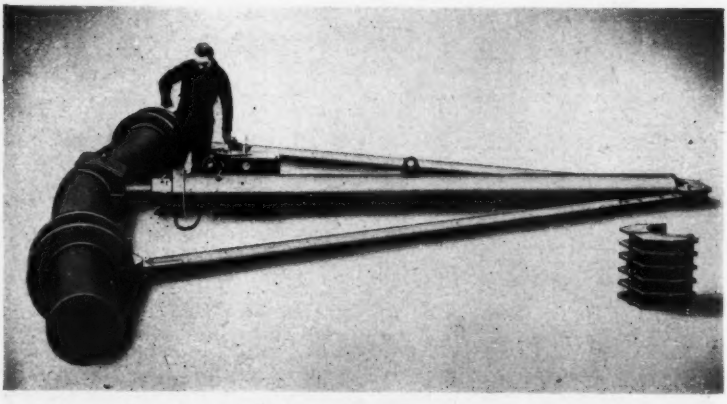
The tapped component now passes down the chute at the left-hand side of the fixture, and is loaded, by hand, into another fixture on the work-table of a bench-mounted, hand-operated machine, which is set up for tapping three cored holes ¼-in. B.S.F. in the top face, to take screws for fixing a cover plate. From this fixture, the component is passed on to a pair of cylindrical guide rails incorporated in a channel-shaped support member, which is mounted on the work-tables of other hand-operated drilling machines, as shown at *F* in Fig. 8. The die casting is subsequently moved from one machine to another by hand, and the operations that are carried out comprise drilling a 0·136-in. diameter hole; drilling, tapping, and spotfacing a 2 B.A. hole; and tapping another hole ⅛ in. B.S.P. The spindles of the drilling machines are staggered so that when the component is brought into contact with cylindrical locating pieces attached to the rear inner face of the channel *F*, the holes to be machined are aligned with the cutting tools. Since drilling and tapping is carried out on cored holes in the die casting, for the 2 B.A. and ⅛-in. B.S.P. sizes, the need for work-holding fixtures is avoided. For drilling the 0·136-in. diameter hole, the conical lower end of an attachment on the drilling spindle engages with a larger-diameter concentric bore in the die casting, to ensure accurate location.

When these operations have been completed, the die casting is brought into line with a tool attached to the piston rod of the air cylinder *G*, which forms a small V-shaped recess in the spot-faced end of the 2 B.A. hole. This hole takes a cheese-headed screw, and when the lubricator is in operation, oil is passed to the compressed air supply between the lower face of the screw head and the V-shaped recess in the seating.

Staffa 18-in. Pipe Bending Machine

Chamberlain Industries, Ltd., Argall Avenue, London, E.10, have recently added to their range the Staffa 18-in. transportable hydraulic pipe bending machine, which is intended primarily for use when pipe-laying is in progress, and has capacity for mild steel pipes up to 18 in. diameter, with wall thickness of ½ in. As an indication of the speed of operation, a pipe of this size can be bent through 10 deg. in less than 10 min.

To facilitate moving the machine from one location to another, it incorporates two arms in place of a forming head of the conventional type. These arms are pivoted at either side of the ram unit, at the rear end, and in operation their outer ends are clamped to the work, as seen in the illustration. A number of alternative pivot holes in the rear end of each arm enables the effective length to be adjusted, for altering the maximum bending radius obtainable. The hydraulic system incorporates a relief valve, to prevent overloading, and is supplied with pressure oil by an air/hydraulic pump.



Staffa 18-in. hydraulic pipe bending machine

The Staveley Group Research Department

By P. A. SIDDERS, Chief Associate Editor

CERTAIN OF THE EXHIBITS of James Archdale & Co., Ltd., and Geo. Richards & Co., Ltd., at the M.T.T.A. International Machine Tool Exhibition last year, incorporated features that had been developed by the Research Department of Staveley Industries, Ltd., of which these two companies are members. The research department was formed towards the end of 1956, at the instigation of Sir Ben Lockspeiser, K.C.B., F.R.S., who had earlier joined the board of the parent company. It was proposed that a centralized department should provide research facilities for the whole group comprising, amongst others, the two firms already mentioned, Cunliffe & Croom, Ltd., Cyril Adams, Ltd., Tilghman's, Ltd., J. H. Shand, Ltd., Bradley & Foster, Ltd., and W. H. Smith & Co. (Electrical Engineers), Ltd. The aim was to provide a closely-knit group for the development of machine tool control systems and automation, with the research department undertaking the basic investigations and development work, the machine tool companies constructing machines based on this work, and the firm of Smith supplying the necessary electronic equipment.

The present premises at Clapham, on the outskirts of Bedford, were taken over in 1957, and were occupied by the research department, under the direction of Dr. E. H. Frost-Smith, in April, 1958. This building was selected because it provided the space required initially, with room for expansion, and because it was conveniently situated between London and the Midlands. Some 10,000 sq. ft. is now occupied by laboratories, workshops and offices, and a new building is to be constructed which will have a floor area of approximately 2,500 sq. ft. This building will house the mechanical engineering laboratory, and will permit the expansion of the other departments within the main building.

Within the research department there are three main sections, concerned with mechanical engineering, control systems, and electronics, and it will be appreciated that the work of the latter two sections overlaps to a certain extent. There is also a design and drawing office, a machine shop and a standards room. Equipment in the latter includes a Hilger & Watts 24-in. line standard, which has been calibrated by the N.P.L., and is within $\pm 0{\cdot}00004$ in. at normal temperature. This standard is used as the fundamental reference by the research department in any work concerned with measurement.

Some 50 people are employed in the department, of whom about half are graduates. Two graduates at a time are recruited from outside and are sent to

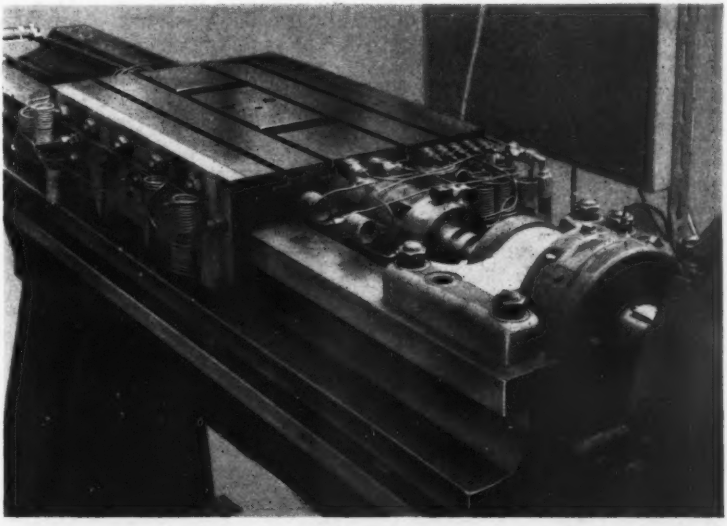


Fig. 1. Test rig for investigations concerned with a hydro-static nut and leadscrew system for traversing a machine tool slide. The screw has a hydrostatic thrust bearing, and is supported radially and laterally within the nut by high-pressure oil

Birmingham University, with all expenses paid by the Staveley Group, where they pursue a 2-year course of studies, under Professor Tobias, formerly of Cambridge University, in order to take their Ph.D. degrees.

The research department maintains contact with other research groups in the machine tool, automation and allied fields. In addition to Birmingham University, it has been in close touch with N.E.L., N.P.L., and the machine tool departments at Manchester University under Dr. Koenigsberger. It is hoped to collaborate with the new Machine Tool Industry Research Association, and it may be mentioned here that Dr. Frost-Smith serves on the committee of that Association.

FEED SYSTEMS OF IMPROVED RIGIDITY

Some examples of the work of the research department will now be considered. Early investigations connected with the numerical control of machine tools indicated that the conventional slide and feed screw arrangements were not satisfactory for precise operation. Hydro-static slideways were therefore investigated whereby the slide is supported on an oil-film of predetermined thickness, the oil being introduced between the slide and its mating slideway at a high pressure. In order to provide axial motion without play, yet without high frictional losses, recourse was had to ball nuts and screws. Two nuts were used with each screw, with a shim between the nuts which could be adjusted to give any desired degree of preloading. This arrangement eliminated play, without unduly reducing the freedom of movement, but preloading introduced other problems, notably deformation of the ball tracks.

It was considered that the hydro-static system that had been employed successfully to slideways could be advantageously applied to feed screws and nuts. An example of such an application is shown in Fig. 1. Series restrictors have been introduced into the system to maintain balanced pressure at the various points in a bearing, under conditions of varying load. Oil is delivered to the slide at a pressure of 20 lb. per sq. in., and to the nut at several hundred lb. per sq. in.

INVESTIGATING THE STIFFNESS OF HYDRO-STATIC SLIDES

Research has been undertaken in connection with the stiffness of hydro-static slides. For this purpose, an Archdale 20-in. horizontal milling machine has been fitted with an auxiliary slide, with a lengthwise projection at each side which is machined to form a hydro-statically supported slideway. Support is provided by oil films between the upper and lower faces of the projections and the guideways in a base, which is secured to the machine table.

For the tests, a workpiece has been mounted on a strain-gauge dynamometer, bolted to the slide, and cutting tests have been carried out by traversing the slide and workpiece. Cutters of various types have been used and both climb and conventional milling have been employed. Variations in the thicknesses of the oil films were checked with the aid of capacitance gauges at either end of the rig, which modulated the frequency of a signal obtained from an oscillator. At the same time, signals obtained from the strain gauge dynamometer were amplified and fed to an oscilloscope to give wave patterns for force and displacement, which were recorded with a ciné-camera.

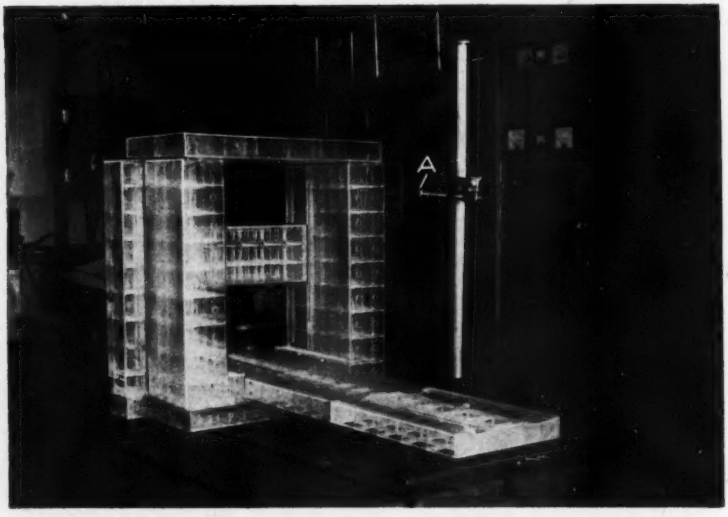


Fig. 2. This Perspex model is being used by the Staveley Group research department to investigate the behaviour of a machine tool structure under load

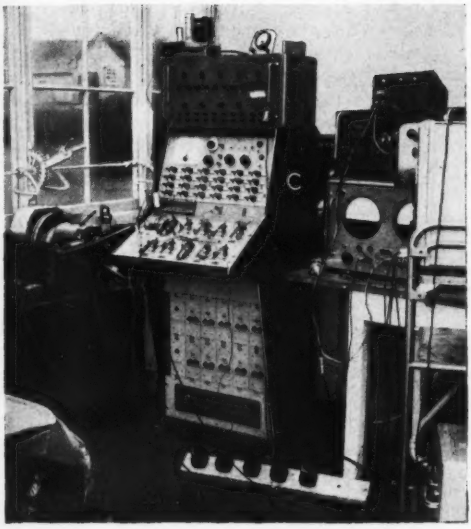


Fig. 3. A set-up for investigating the performance of a hydraulic motor for a machine-tool feed system. Operating conditions are simulated with the aid of the computer *C*

PERSPEX MODELS OF MACHINE STRUCTURES

The research department makes use of Perspex models of machine tools to predict the dynamic behaviour of a design before the actual machine is built. On this basis, the behaviour of an Archdale 20-in. horizontal milling machine has been investigated. The Perspex model of the Archdale machine was made in the workshops at Clapham, and the dynamic performance of the machine itself was checked at the research department. Comparison of the results obtained indicated that it was necessary to carry out investigations on a model of the complete machine, and not with individual elements, in order to obtain a reasonable true prediction of performance. It was found possible, moreover, to determine a relationship between the performances of the model and machine to a useful order of accuracy.

A scale model of a large planing machine is now being constructed at the research department for similar investigations, and is shown in Fig. 2. The model is being investigated by checking the deflection of the various elements under applied vibration. For this purpose, it is coupled to a Goodman's type V.47 vibrator, powered by an amplifier supplied by the same company. A piece of aluminium foil is attached to the element under investigation, by means of grease, and a ferroxcube E-core proximity pick-off unit *A* is applied at a series of positions, to detect deflection of the model. The pick-off unit forms part of a frequency modulated circuit, and is supported by an arm that is attached by a universal clamp to a vertical pillar fitted to an Eclipse permanent magnet base. When necessary, the frequency of the applied vibration can be checked with a Venner counter-timer unit, and the phase of the vibrations is determined with a Muirhead phase meter, against a known reference.

HYDRAULIC MOTORS

Interest in transmission systems and drives for machine tools has led the research department to investigate the possibilities of hydraulic drives for machine tool feed systems. The equipment seen in Fig. 3 is being used to determine the capabilities of a hydraulic motor *B*, for a machine tool servo-drive.

The equipment includes a Solartron Minispace

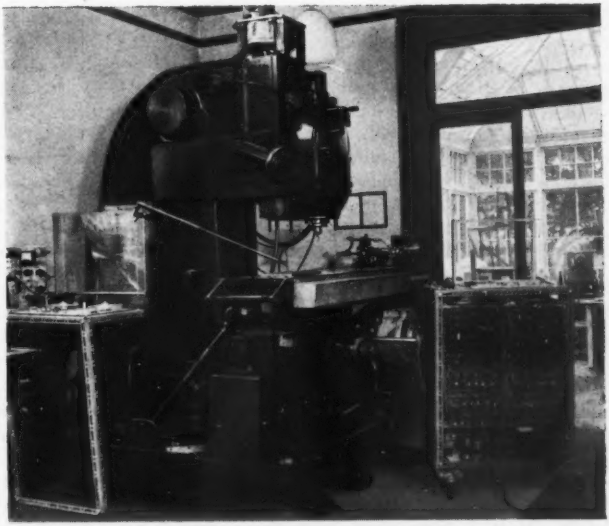


Fig. 4. This Archdale vertical milling machine has been arranged for programme control in three directions by the Staveley Group research department. Different drive systems are used for movements in each direction, so that their merits can be evaluated

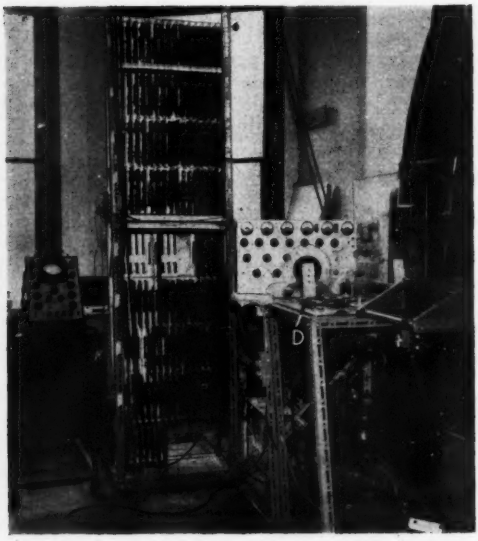


Fig. 5. The research department has built this computer for the production of tapes for the control of the milling machine seen in Fig. 4. Any contour composed of straight lines, circular arcs, or parabolic curves can be machined

computer *C*, which is being used to simulate the dynamic performance of the machine tool. A flywheel is fitted to the output shaft of the motor to simulate inertia mechanically, and drive can be taken from the flywheel to a d.c. generator to provide an electrical load. The motor is fitted with a pressure transducer head, and drives a tacho-generator to give indications of the pressure of the oil and the output speed.

TAPE-CONTROLLED CONTOUR-MILLING MACHINE

An Archdale 34-in. vertical milling machine has been converted for contour milling under tape control and is being used to evaluate different types of servo systems and drives. Control is provided in three directions (*x*, *y* and *z* axes), and motion in any two directions can be controlled simultaneously. A general view of the machine is given in Fig. 4, and the control equipment mounted in the trolley seen at the right incorporates the tape deck. Joy-stick type manual control is provided.

Signals to control the machine are recorded on ¼-in. wide magnetic tape. There are four tracks—one for each axis and one for a reference signal.

Each moving member of the machine is provided with a measuring system of Staveley type. This system has no moving parts and makes use of a reflection grating, with 100 lines per inch. The grating is scanned by four sections of grating, arranged in a "4-phase cursor," and light signals transmitted from the reflection grating through the cursor gratings are detected by four photo-cells, which are switched in and out by signals derived from the reference track of the control tape. The feed-back signal from the measuring system is compared with the signal from the tape, for each axis, by means of a phase comparator. An output signal is generated, the mean d.c. level of which is in proportion to the error of movement along that particular axis, and is used to adjust the position of the associated machine member. If the phase difference between the feed-back signal and the tape signal exceeds ±½ cycle (that is, ±0·005 in.), the machine is stopped.

COMPUTER FOR TAPE PREPARATION

The research department has built a computer for the preparation of tapes, and this equipment is installed at one side of the Archdale milling machine, as seen in Fig. 5. Signals for the machining of any shape composed of straight lines, circular arcs or parabolic curves can be derived from the computer and recorded on tape by means of the tape deck *D*. Information is fed to the computer by means of punched paper tape, prepared on a Friden Flexowriter, from data given on a planning sheet. The punched tape is read by a Creed unit, and the computer converts the information into phase signals that are correct to within 0·0001 in. Of compact design, the computer is fully transistorized, and could be housed in a standard cabinet measuring 6 by 2 by 1 ft.

"IMPROVER" FOR MOLY-VI-BOND MOLYBDENUM DISULPHIDE. K. S. Paul (Molybdenum Disulphide), Ltd., Angel Road, London, N.18, state that the resistance of their Moly-VI-Bond dry-film bonded coating of molybdenum disulphide to abrasion, oxidation, and attack by acids and alkalis, can be further increased by the addition of about 2 per cent of a special composite type resin. The additive also improves the elasticity of the film, and thus facilitates the subsequent processing of parts made from light alloys, tin-plate and steel.

The new "improver" is colourless, non-toxic, and odourless. In use, it is merely mixed with the Moly-VI-Bond, and the resulting compound has a minimum shelf life of four months. There is no change in the method of application of the bonded coating, except that hot curing is essential.

Assembling Domestic Radio Sets

Some Aspects of the Practice and Equipment at Corran Works, Ltd., Larne, Northern Ireland

By A. W. ASTROP, Associate Editor

A FACTORY FOR THE ASSEMBLY of a wide range of domestic radio sets was established at Larne, Northern Ireland, by Corran Works, Ltd. (a member company of the Pye Group) in 1948, and was among the first to be erected in connection with the post-war industrial development programme instituted by the Northern Ireland Government. Reference was made to this programme in an editorial published in MACHINERY, 98/579—15/3/61, and it is sufficient to recall here that one of the main objectives was to diversify the manufacturing activities of Ulster, which previously had depended very largely on the agricultural, textile, shipbuilding and aircraft industries. In seeking to attract new industries, the Northern Ireland Government was primarily concerned with the reduction of unemployment, and, in consequence, was anxious to attract types of manufacture in which labour represented a major factor. In this respect, the radio industry, particularly as regards assembly, has much to offer, and Corran Works, Ltd., began production in a new factory of 30,000 sq. ft., with plans to employ about 250 people.

The factory was erected by the Northern Ireland Ministry of Commerce, and two additional buildings were subsequently provided on the site, to give an additional 20,000 sq. ft. of covered space. With the additional facilities, the number employed had increased to 500 by 1954, and two years later the main building was enlarged by the construction of a 55,000-sq. ft. extension. Employment has continued to rise steadily, and work is now provided for 950 people, of whom approximately 80 per cent are women. At present, still another extension is being built which will provide 50,000 sq. ft. of extra covered space, and will be employed mainly for storage. Space will thus be released in the production area which is currently being used for storage purposes.

Twenty-four different types of sets were in production at the time of our visit, of which 15 are transistorized and 9 of the conventional valve-type. The sets are broadly classified as domestic, pocket, and cabinet models, and of the 24 types being assembled, 17 are specifically intended for export. At peak periods, as many as 34 different types of

Fig. 1. During certain stages of assembly, simple fixtures of the type here shown are used to hold the circuit boards. The fixture can be "rolled" to provide access to both sides and both edges of the board

sets have been in continuous production at one time. In addition to assembly, facilities are provided for the production of a limited range of components, including printed circuit boards, which are used extensively; tuning dials, of a wide range of designs and sizes; and coils. A general view in the main building, showing part of the coil winding section, is given in the heading illustration. The company is also concerned with the production and packaging of complete kits of radio parts, which require only to be assembled. A wide range of these kits is made, and this activity accounts for an important part of the output, particularly in connection with export trade.

The assembly methods employed are generally conventional, with lines of operators seated at benches arranged transversely in the main building. Each operator is responsible for inserting specific components before the chassis is passed down the line, and in this manner it is progressively built up to completion. A simple, but effective, fixture is employed for holding each chassis during certain stages of assembly, and a general view of such a fixture is given in Fig. 1. It will be seen that it incorporates two hoops, made from steel strip, which are welded, one at each end, to a simple fabricated frame. This frame incorporates a pair of thumb-screw type clamps, one of which may be seen at *A*, for securing the chassis in position.

The hoops rest on two parallel lengths of electrical conduit, which extend along the bench and are arranged at such a height that the bottoms of the hoops are held clear of the bench-top by about ¼ in. With this arrangement, the complete fixture can easily be turned about the longitudinal axis to afford access to both sides and both edges of the chassis, yet will remain steady in any position, so that the operator's hands are free for assembly or soldering, for example. Subsequently, the fixture and chassis are slid along the rails to the next operator, who is seated close by. Behind the fixture in Fig. 1 may be seen a simple rack, built-up from welded steel strip, which serves to hold a number of plastics containers for the components to be assembled at this station.

Fig. 2. One of a number of mobile test units which are employed for checking the radio sets at various stages during the course of assembly

Fig. 3. This box-type jig facilitates threading three wires through a thin strip of insulant, to form a small sub-assembly

MOBILE TEST STATIONS

Electrical testing, on a 100 per cent basis, is carried out at numerous stages during the assembly procedure, and the equipment for performing certain tests is of the mobile type. Designed and built by the company, each test station comprises a wood knee-hole type desk, as seen in Fig. 2, at the left-hand end of which there is an extension whereon the main test equipment is mounted. The major item is a multi-frequency generator, which may weigh as much as 1 cwt., and is mounted at an angle so that the controls are readily accessible to the inspector's left hand. A set to be tested, in this instance an almost completely-assembled portable radio, is placed on the desk top, and checked with the aid of the dial-type instrument seen at the rear. This instrument is carried in a simple frame which is mounted on a substantial pillar at one corner of the desk top.

As the desk is mounted on six rubber castors, it can easily be moved to any required position along the assembly lines, or to a maintenance bay. This mobility is of great assistance when the assembly lines are re-arranged to provide for the production of different types of sets, and the test stations are required to be located in fresh positions. Moreover, if fewer test stations are required for a given set than for the type that was previously being assembled, the redundant units can be wheeled away to a store, where they are less likely to be accidentally damaged.

MECHANICAL AID FOR PRODUCING A SMALL SUB-ASSEMBLY

A small sub-assembly, which is required in very large numbers, comprises a group of three wires threaded through a rectangular strip of transparent insulating material, as seen in the foreground in Fig. 3. These small assemblies, are produced very rapidly and easily with the aid of the simple box-type fixture. Projecting from a steel plate at the front of the box there are three small-bore tubes, the ends of which are machined at an angle of approximately 30 deg. Wires from three coils supported on a stand at the rear of the bench are passed through holes in the rear wall of the box, and thence through the tubes, so that a short length projects from each.

The strips of insulating material are pre-punched with three rows of three equally-spaced holes, and a stack of strips is loaded on to the projecting tubes, which pass through the uppermost holes. Initially, the projecting ends of the three wires are bent upwards, and over, away from the operator, so that three backward-facing hooks are formed. The operator now grips the lower end of the first insulating strip in the stack, and by curling it upwards, and away from her, threads the centre group of holes over the three tubes. Next, she pulls the end of the strip downwards, and forwards, so that the last group of holes engages with the hooked ends of the wires.

She then pulls the strip towards her, so that it slides off the tubes, and continues this movement until there is a free length of wire of about 4 in. extending beyond the trailing end of the insulating strip. The next operation is to swing the strip upwards, and backwards, to bend the wires at the points where they leave the tubes. Finally, the three wires are severed with scissors in such a way as to leave three backward facing ends, or hooks, in readiness for the next strip to be brought forward and threaded in a similar manner. This simple fixture ensures that the wires of each assembly are cut to the same length, and greatly facilitates the threading operation, which, on account of the thinness and lightness of the insulating material, would otherwise be a difficult and tedious procedure. Each sub-assembly is threaded and cut-off in about 4 sec.

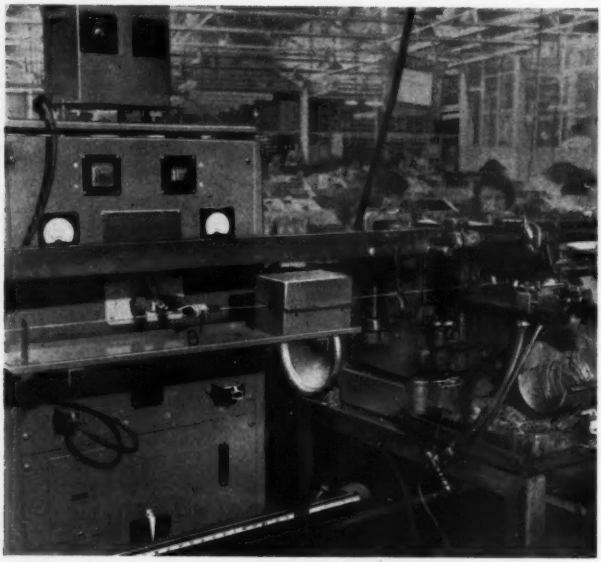


Fig. 4. This Radyne induction heating set is used in conjunction with the Artos wire cutting and stripping machine at the right, and obviates frayed wire-ends at the stripping stage

MODIFIED WIRE-STRIPPING MACHINE

Extensive use is made of wires which are pre-cut to specified lengths and stripped of insulation over a short length at each end. Automatic wire-cutting and stripping machines are employed, one of which can be seen at the right in Fig. 4. This machine was built by the Artos Engineering Co., Milwaukee, U.S.A. (Gaston E. Marbaix, Ltd.). Certain difficulties were experienced in connection with the stripping stage of the machine cycle, in that, although the insulation was removed cleanly, the wire strands were sometimes disturbed, and the ends were then slightly frayed. Wires with frayed ends, in turn, caused difficulties during assembly and soldering.

To overcome this trouble, the company operate the machine in conjunction with a Radyne induction heating unit, which was developed specifically for use in association with the Artos machine. This unit is seen at the extreme left in Fig. 4, and the heating coil is indicated at *B*. Wire is drawn from a reel to the left of the Radyne unit—and not shown in the figure—and the leading end is passed through the induction coil *B*, and thence to the Artos machine. The heating unit is switched on and off by limit switches, which have been fitted to the Artos machine, in synchronism with the operation of the latter, and with this arrangement the coil *B* is alternately energized and de-energized.

It is energized when the wire is momentarily stationary—during the stripping and cutting-off stages on the Artos machine—and the heat applied is just sufficient to "wet" the tinning on the wires without affecting the plastics insulation surrounding them. As a fresh length of wire is pulled through by the Artos machine, a limit switch is tripped to cut-off the heating current, which is restored only when the wire feed movement has been completed. It will be appreciated that with this arrangement there are short lengths of wire, at regularly spaced intervals, on which the tinning has been wetted sufficiently to bond the various strands together. Moreover, the strands are bonded at the points where the wire is to be cut and stripped, with the result that they are not disturbed or frayed by these operations.

The Radyne unit is mounted on steel rails, arranged parallel with the run of the wire, on which it can be adjusted to the required position relative to the Artos machine, according to the length of wire to be cut. This adjustment is carried out with reference to the scale and pointer seen in the left foreground of the illustration.

FLOW-SOLDERING FACILITIES

Flow-soldering of printed circuit boards is carried out with the aid of a continuous machine supplied by Fry's Metal Foundries, Ltd., and a close-up view of the working area of this equipment is given in Fig. 5. The molten solder is forced continuously over a weir, as at *C*, by means of a motor-driven impeller, and the circuit boards are held in simple jigs and are traversed over the weir by slowly-moving endless chains. These chains are housed within the channel-sections at *D*, and the links are engaged by pegs which project from the under-sides of the jigs.

The jigs are so designed that they are readily adjustable to accommodate a range of circuit boards of different widths, and the latter can be loaded and unloaded quickly without the need for manipulating screw clamps or clips. Of welded steel construction, each jig incorporates a pair of strips at each end, arranged transversely and with

a gap between them, one pair being indicated at *E*. The gap between each pair of strips serves to accommodate a bolt whereby the strip *F* is secured, and this strip is positioned and clamped to suit the width of the circuit board which is being handled.

Secured to the strip *F*, and projecting downwards, are two ½-in. diameter pillars, and close to the lower end of each pillar there is a V-shaped annular groove, of a width to suit the thickness of the circuit board. Another strip, *G*, is of similar design to the strip *F*, and has two identical pillars with annular grooves at the lower ends. The strip *G*, however, is arranged to slide on the members *E*, and is connected to the strip *F* by a tension spring at each end. To load a circuit board, it is necessary only to pull the strip *G* towards the front of the machine, against the tension springs, with the left hand. The circuit board is then loaded from the top, and the rear edge is engaged with the grooves in the pillars on the strip *F*. Next, the strip *G* is released slowly, whereupon the grooves in the pillars on this member engage the front edge of the circuit board, and the latter is gripped under spring pressure.

The strip *G* is prevented from rising or tilting, under the pull of the springs, by screws and washers which engage with the under-sides of the strips *E*. When the jig has passed over the solder bath, the strip *G* is pulled towards the operator once more, to release the circuit board which can then be lifted out. It may be mentioned that for purposes of illustration a sheet of white paper was inserted beneath each jig seen in Fig. 5, in order to show the construction in more detail.

In a second article on Corran Works, Ltd., to be published shortly, reference will be made to a stores system whereby control is maintained over more than 4,500 different types of bought-out components used in the company's radio sets.

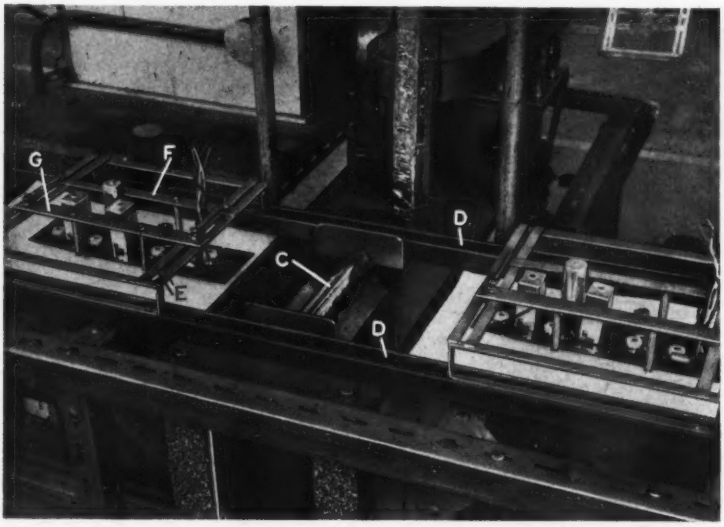


Fig. 5. The jigs used in conjunction with this Fry's continuous flow-soldering machine will accommodate a wide range of circuit boards, and provide for rapid loading and unloading

---

CALOR P4 FLAME CUTTER. An oxy-propane flame cutter, known as the Calor P4, for which some important advantages are claimed, has been introduced by Calor-Midgley, Ltd., the Sheffield subsidiary of Calor Gas (Distributing) Co., Ltd., Poland House, 116 Oxford Street, London, W.1. This cutter, developed by Mr. A. Foster, a technical representative of the company, is said to be capable of cutting steel up to 5 ft. thick, using a straight mixture of Calor propane and oxygen.

A slab of 42-in. thick carbon steel, cut at the rate of 10 ft. per hr., was among the company's exhibits at the recent Engineering, Marine, Welding and Nuclear Energy Exhibition. The cutter has also been used to advantage for "parting" the tops and bottoms of very large, hollow ingots, between 55 and 58 in. diameter. Previously, parting by machining, involving annealing and cooling, occupied as much as 240 hours, whereas with the P4 cutter, the time required is only 80 min., and there is a substantial saving in fuel costs. It is stated that the success of the P4 cutter depends on the fact that the propane gas and oxygen are mixed in the cutting nozzle, and not in the barrel. Low oxygen pressures—25 lb. per sq. in. for heating, and 30 lb. per sq. in. for cutting—are also of importance, since at these pressures greater effective depth of penetration is achieved.

Machine Tool Industry Research Association

A REVIEW OF THE PROGRESS that has been made in the establishment of the Machine Tool Industry Research Association has recently been published*. The director, Mr. A. E. De Barr, B.Sc., F.Inst.P., took up his duties on April 1, and the Council has appointed Mr. J. A. Mozley as secretary. Mr. Mozley has had experience of research association work, and took up his appointment on June 5.

Pending the finding of suitable office accommodation in the South Manchester district, temporary offices have been rented in the centre of Manchester. The headquarters of the Association were transferred to the latter premises on June 5, and, until further notice, all correspondence should be addressed to:—The Director of Research, The Machine Tool Industry Research Association, 28 Deansgate, Manchester, 3 (telephone Blackfriars 3851, extension 110).

The chairman of the Association, Mr. J. C. Snow, and the director have visited the National Physical Laboratory, Teddington, to discuss the work of the laboratory in relation to machine tool problems. The director has also visited the following establishments to discuss machine tool research in progress:—National Engineering Laboratory, East Kilbride; Department of Mechanical Engineering, Manchester College of Science and Technology; Department of Mechanical Engineering, Birmingham University; Production Engineering Research Association, Melton Mowbray; and College of Aeronautics, Cranfield. He has also visited the factories and laboratories of several member firms to discuss their work and problems.

Earlier this year, application was made to the Department of Scientific and Industrial Research for a grant-in-aid. The terms of the grant subsequently offered are particularly generous, and the chairman has expressed the hope that the industry will respond wholeheartedly to the offer and show faith in itself and its future by enabling the Association to qualify for the maximum amount. The grant is for a period of five years, starting January 1, 1961, and follows the established pattern of D.S.I.R. grants, which require re-application to be made every fifth year. Briefly, the terms provide that if the Association in the first three years of the 5-year period raises an annual income (approved as grant-earning) of £40,000, then D.S.I.R. will make an annual block grant of £40,000. For each complete £100 by which the grant-earning income exceeds £40,000, D.S.I.R. will make an additional grant of £80, up to a maximum additional grant of £28,000 per year. For each of the last two years of the 5-year period, provided that the Association raises an annual grant-earning income of £80,000, D.S.I.R. will make an annual block grant of £60,000, and for every complete £100 of additional income, an additional grant of £80 will be made, up to a maximum additional grant of £20,000 per year. As examples of the income that the Association could derive, it may be mentioned that, in the years 1961-63, if members' subscriptions (that is the grant-earning income) amount to £40,000, the total income will be £80,000; if subscriptions are £75,000, total income will be £143,000. For the years 1964 and 1965, subscriptions of £80,000 will result in a total income of £140,000; and subscriptions of £110,000, a total income of £190,000. If the machine tool industry responds fully to the offer, D.S.I.R. will pay almost 50 per cent of the cost of research carried out by the M.T.I.R.A. (as compared with an average of about 30 per cent for other industrial research associations).

An outline research programme was included in the Association's application for the grant, and it is envisaged that work will be carried out under the following main classifications:—performance of machine tools; design features; small tools and accessories; measuring techniques and methods of control; production processes and new methods; field studies and productivity studies. It is planned to provide a technical information service to meet the needs of the machine tool industry, and a technical advisory service to assist members, particularly in the application of the results of research and development work.

* M.T.I.R.A. News Letter, No. 1, May, 1961, available to nominated representatives of member firms.

A DUSTLESS DRILLING HAMMER, for use on concrete, rock, stone, or brick, has been introduced by Thor Tools, Ltd., Tynemouth, Northumberland. This hammer is pneumatically operated, and is so designed that a high velocity reverse-flow of air draws chips and dust through the drill-bit and rod and delivers them into filter tanks. Both the bore and the surrounding atmosphere are thus kept clear of dust, and it is claimed that the tool offers particular advantages for drilling inside buildings.

NEWS OF THE INDUSTRY

Tyneside

NOBLE & LUND, LTD., Felling-on-Tyne, report an increasing call for all the machine tools in their range, and particularly for special purpose and cold sawing machines, many of which are to be supplied with automatic feeding arrangements. Machines which have recently been ordered include a number of 6-in. spindle horizontal borers; a 63-in. centre lathe; a 30-in. centre lathe; a 60-in. high-speed cold sawing machine for export to Germany; and a 68-in. centre lathe for Brazil.

We are informed that the recently introduced Millahead planer/miller conversion unit and the horizontal Millahead machine, which we hope to describe fully in a future issue, have been well received.

A large amount of development work is at present being carried out, and we noted that the prototypes of an automatic measuring device and a new 4-ft. capacity plano-milling machine are at present in hand. We hope to publish full details of these developments at a later date.

Machines seen in progress in the works included a large number of vertical and horizontal type hydraulically operated, cold sawing machines of various sizes; a 30-in. centre lathe which is to be equipped with electronic tracing equipment for copy turning; a column and base type horizontal Millahead machine, with a horizontal traverse of 17 ft. and a vertical traverse of 8 ft.; and a 60-in. table-type cold sawing machine for cutting aluminium slabs. The table of the latter machine is of the power-driven roller type, and two cutting speeds of 1,500 and 3,000 ft. per min. are available.

Among the machines recently despatched from the works may be mentioned a lathe with a centre height of 20 in. and a capacity of 32 ft. between centres, for which the main drive is provided by a 75-h.p. motor, and a 38-in. horizontal table type, Fluifeed cold sawing machine which was specially designed for cutting slabs of 99·1 per cent pure aluminium. We are informed that test pieces were cut on this machine at a rate of 420 sq. in. per min.

Other activities of the company include gear cutting, gear grinding, and spline hobbing and grinding for the trade. The foundry is maintaining an output of approximately 40 tons of castings per week, some of which are for outside customers. There is provision for handling castings with individual weights up to 20 tons.

CLARKE, CHAPMAN & CO., LTD., Gateshead-on-Tyne, report that the works are busy on a variety of products. A lively demand is being experienced for their range of single-direction turbines for driving tank-purging fans on board tankers, and orders are in hand from both the home and export markets for reversing steam turbines for marine applications. There is considerable activity in ships' deck machinery, including electric, steam, and hydraulic winches, capstans, and windlasses, and it may be noted that an order has recently been received for trawl winches for installation on four factory trawlers for Russia, which are being built on the Continent.

BUMA ENGINEERING CO., LTD., Robson Street, Newcastle-on-Tyne, inform us that a steady flow of orders is being received for their Cent-Ro-Mac portable fine boring machine from the shipbuilding and heavy engineering industries, and that production in the fabrication and the contract machining departments is being well maintained.

This company also builds prototype machinery and special purpose machines and equipment, which can be designed to suit customers' requirements, or made to drawings and specifications supplied. The services of the shot-blasting and metal spraying department are in good demand from various branches of industry, and we are informed that a number of mobile shot-blasting and metal spraying units has been formed to enable work to be carried out on site.

New machine tools recently installed in the shops have included a Jones-Shipman type 1400 surface grinder, a Newall jig boring machine, and a Berthiez planing machine of 3 ft. square by 13 ft. capacity.

LUMSDEN MACHINE CO., LTD., Hawks Road, Gateshead-on-Tyne, report that a satisfactory volume of orders is in hand for the various machine tools in their range, and that an increasing number

of enquiries is being received from both the home and export markets. Orders on the books indicate a steady call for standard types and a substantial increase in the demand for special-purpose and large-capacity machines. Among those recently ordered may be noted three 100-in. vertical spindle, rotary-table, grinding machines; a number of continuous grinders for the motor vehicle industry, of the rotary table type, and fitted with single, twin, or multiple grinding heads for completing components at one pass; a 16-ft. reciprocating table type grinder for a customer in Belfast; a number of rotary, retracting table type machines; a reciprocating table grinder for France; three rotary, retracting table type, die grinders for India; a 60-in. machine equipped with a rotary table mounted on a traversing table, and a grinding head carried on a cross-rail, which has been modified to swing 84 in. diameter, and is to be used for rotary, reciprocating, and internal grinding; and a reciprocating machine for France with a 20-ft. long by 4-ft. wide table, and a work height capacity of 3 ft.

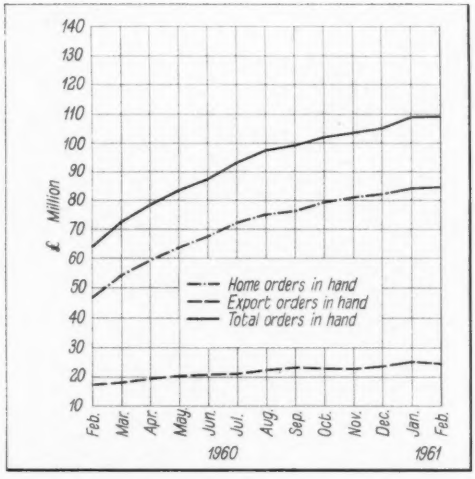
To enable the works to keep pace with the increasing demand and to assist in overcoming the shortage of skilled labour, a certain amount of plant replacement is being carried out. Machines and equipment recently installed have included a Herbert Pre-optive turret lathe, and sand blasting plant, and a large Richards boring machine is on order for delivery in the near future.

LERCHE MACHINE TOOLS, LTD., Oakwellgate, Gateshead-on-Tyne, who are sole distributors of a wide variety of British and Continental machine tools and equipment, inform us that the demand from all branches of the engineering industry is maintained at a high level.

Machines and equipment displayed in the showrooms include capstan and centre lathes, tool grinders, welding plant and machine vices. We are informed that the company have recently been appointed Northern Area agents for Melbro electro-magnetic clamping type portable drill posts, which are available in a range of three sizes, up to 2¼-in. diameter drilling capacity.

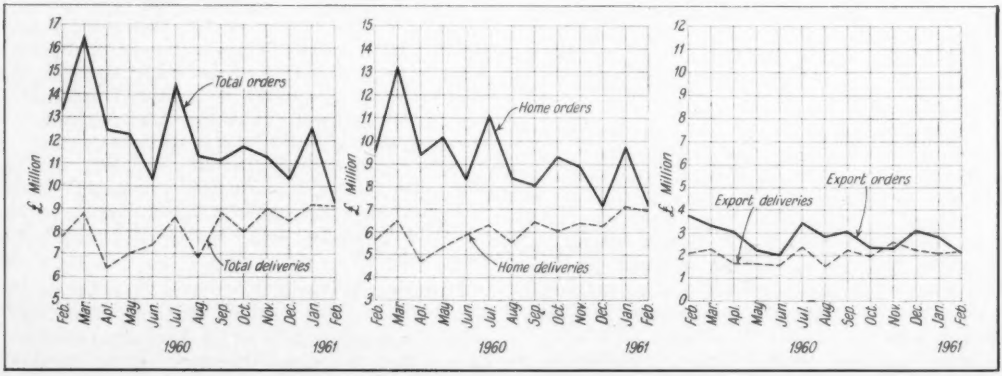
CHURCHILL GEAR MACHINES, LTD., Blaydon, Co. Durham, report a continued growth in the demand for their machine tools and equipment.

❖ ❖ ❖


£ Million
Home orders in hand
Export orders in hand
Total orders in hand
Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec. Jan. Feb.
1960
1961

❖ ❖ ❖

The accompanying graphs show the values of machine tool orders and deliveries during the past twelve months also the values of orders in hand



Orders are in hand at present for gear hobbing, shaving, hard honing, chamfering and rounding, forming (rolling), washing, and checking machines, also for gear sound testers, and Conomatic automatics, the latter being built under contract for The Cone Automatic Machine Co., Ltd.

It was noted that a large amount of automatic loading and transfer equipment is at present on order for use with the company's machines, and we are informed that the demand for this type of equipment is increasing. Orders recently received have included one for the supply of 37 automatic gear hobbing machines and 14 automatic gear shaving machines, to an automatic gearbox manufacturer.

All types of machines were in progress in shops including a battery of the recently introduced hard gear honing machines. Production in the cutter department is being maintained at a high level, and customers are making increasing use of the cutter re-grinding service operated by the company. Products to be shown at the forthcoming Brussels exhibition will include a fully automatic Mk.4. production gear hobber, a shaving machine, and a gear honing machine.

New plant which has been installed in the works since our last visit includes a Scharmann type F.B.125.C. horizontal boring and milling machine, a Futurmill planer/miller conversion unit, and a Delapena honing machine.

R. SUTCLIFFE.

The South

STARTRITE ENGINEERING CO., LTD., Gillingham, Kent, are still very busy with the production of machines for bandsawing, bandfiling, drilling, and abrasive band polishing operations. To enable output of such machines to be increased, the shops have again been extended.

HYTHE ENGINEERING CO., LTD., Hythe, Kent, are well occupied with a variety of products including structural steelwork, metal balustrades and stairways, pressure vessels, and pile driving equipment. Several dosage units, for use in connection with water purification, have recently been completed for export. The existing premises are too small for the company's anticipated future requirements, and to provide improved facilities, a new factory is to be built on a neighbouring site. Initially, a number of bays with a combined area of 3,600 sq. ft. will be erected and a 10-ton overhead travelling crane installed. Eventually it is hoped to quadruple the area in several stages.

INDUSTRIAL TECHNICS (SOUTHAMPTON), LTD., Empress Road, Southampton, who, as already announced, are now a subsidiary of Dowding & Doll, Ltd., London, W.14, are building machine tools and injection moulding machines and producing a variety of parts under sub-contract. Atlantic co-ordinate tables are in production, equipped with positioning control equipment. One such table was incorporated in a closed frame boring machine built by the company for installation in the works of William Asquith, Ltd. Weighing more than 13 tons, this machine has a base with overall dimensions of 12 ft. 9 in. by 8 ft. 6 in. The Atlantic table is so arranged that the directions of traverse are at 45 deg. to the bridge, and in this way it has been possible to provide for a greater range of table movements for a given column spacing than could normally be obtained.

At present the shops cover an area of approximately 16,000 sq. ft. and are working at full capacity. Recent additions to the plant include a Richards No. 2 boring machine and a Ward No. 7 Prelector turret lathe. Delivery of a Butler 4A planing machine of 10 ft. stroke is expected shortly.

MURAD DEVELOPMENTS, LTD., Whiteway, Queenborough, Isle of Sheppey, Kent, formerly at Stocklake, Aylesbury, Bucks., are experiencing a satisfactory demand for capstan lathes and the EG 8 pedestal-type off-hand grinding machine, which is provided with wheel hoods of special design that are stated to be effective in preventing the spread of dust produced during grinding. The Bormilathe, introduced to meet the demand for a machine which can be employed for boring, milling, and turning operations, has proved of interest both to industrial and experimental establishments, and one of the latter has placed repeat orders as a result of the advantages gained from the machine originally installed. Quantity production of the Bormilathe will begin as soon as the arrangements for providing the necessary machining facilities have been completed.

F. W. HERRIDGE.

Advice for the Small Firm

Sources of advice for the smaller firm was the subject of a recent 1-day conference held by the Central London Productivity Association, which is affiliated to the British Productivity Council, 21 Tothill Street, London, S.W.1.

Presented by Mr. A. Thorogood, of the Department of Scientific and Industrial Research, the first paper was entitled "D.S.I.R. Technical Services for the Smaller Firm," and drew attention to the activities of the 51 grant-aided industrial research organizations from which advice was readily available. With the aid of coloured slides, the speaker gave details of various advisory services, and he

explained that, in certain instances, D.S.I.R. might be able to put small firms in touch with field officers who would assist them in solving their problems. Quick advice on technical matters could be obtained by telephoning the D.S.I.R. technical information division (telephone No. Hunter 1212, extension 727).

Dr. Margaret Wray, of the Federation of British Industries, spoke on the economic data that were available in various statistical publications, and she explained how F.B.I. economic surveys were conducted. Typical experiences of an advisory organization were described by Mr. F. M. Algar, of the Rural Industries Bureau.

Mr. D. W. W. Roberts, of the National Provincial Bank, dealt with the various courses which could be adopted by firms wishing to export their products for the first time. He pointed out that firms could freely consult the Export Services Branch of the Board of Trade for general guidance and for more detailed advice. Moreover, advice could be obtained from the overseas department of a firm's own bank. Mr. Roberts explained in some detail the many methods of payment which could be used, and he emphasized the advisability of taking out credit insurance.

Finally, Mr. J. B. Darner, of the National Union of Manufacturers, gave details of his organization, and he drew attention to the facilities afforded by the Union's Industrial Advisory Service at Thames Chambers, 12 York Buildings, Adelphi, London, W.C.2. This body offers specialist consultant service in a wide range of management problems, and this service is not confined to member firms, although membership of the N.U.M. affords concessions in respect of fees.

Applications of Electrostatic Forces

(*Continued from page* 1275)

fluid which ensures that no air is present between the contact faces.

Electrostatic charges of opposite polarity are then generated on the contact surfaces of the chuck and the workpieces, to produce the required holding force, by means of a compact power unit. Any electrically conducting material can be held, including, for example, brass, aluminium alloys, and non-magnetic stainless steels. It is also possible to grip parts made from ceramics or plastics if the contact surfaces are previously coated with a thin metal film.

It will be evident, therefore, that electrostatic forces can be usefully applied in a variety of ways, and as further experience is gained in this field it is probable that these forces will be utilized for the solution of other problems.

Industrial Notes

JOHNSON, MATTHEY & CO., LTD., 73-83 Hatton Garden, London, E.C.1, can now supply zone-refined germanium, normally in ingots of 1 kg. nominal weight. A large scrap-recovery plant has been installed, and the company now wishes to purchase large or small quantities of germanium scrap.

E.M.I. ELECTRONICS, LTD., Hayes, Middlesex, inform us that they have received an order from Société Genevoise d'Instruments de Physique, Geneva, for six E.M.I. rotary control systems to be applied to Rotoptic rotary positioning tables. It is stated that this order, which is valued at approximately £20,000, has been placed following extensive tests with prototype equipment.

RESETTLEMENT OF THE DISABLED IN A CHANGING SOCIETY will be the subject of a 3-day course and conference to be held at The University of Liverpool on July 18 to 20. The event is being organized by the British Council for Rehabilitation of the Disabled, Tavistock House (South), Tavistock Square, London, W.C.1, from whom full particulars can be obtained.

RENOLD CHAINS CONTINENTAL, LTD.—The Belgian branch of this organization has moved to new premises at 1 Allee Verte, Brussels. The building, which comprises three floors and a sub-basement, provides an area of more than 20,000 sq. ft. Large stocks of chains and wheels and power transmission accessories are carried, and there are facilities for the production of special wheels.

MOON BROTHERS, LTD., Beaufort Road, Birkenhead, Cheshire, have introduced the CD hand-operated machine for cutting off the tops of steel drums of almost any size. Gauging rollers hold the machine in position, and the cut is made just below the end seam. Hardened steel cutters are employed and drive is transmitted through reduction gearing. A clean cut is obtained, and the edge can subsequently be curled or flanged, if required.

THE BRITISH OXYGEN CO., LTD., Spencer House, St. James's Place, London, S.W.1, have issued the first number of a house journal entitled *Arc* which replaces Quasi-Arc *Welding News*. This change has been made as a result of the arrangement whereby the sales activities of Quasi-Arc, Ltd., are being carried on in the name of the Electric Welding Department of British Oxygen. Under the new title, the style and presentation of the journal have been revised, and the scope has been broadened to embrace Argonarc welding and allied processes. This first number, which is very well presented, includes, for example, articles on Argonarc and its applications, low cost lightweight welding sets, a high-lift boom for streamlined production, flux materials, and hard facts on hard facing.

ELECTRO-CHEMICAL ENGINEERING CO., LTD., Sheerwater, Woking, Surrey, recently opened a new depot at Moor Lane, Witton, Birmingham, 6, which has been provided at a cost of £50,000. This depot has been built on a site of 2 acres which provides space for future expansion, and in addition to offices and stores, a laboratory will shortly be in operation to provide services for testing and

analysis. The main stores are housed in a building with dimensions of 115 ft. by 47 ft., and effective utilization of space has been ensured by the provision of interchangeable steel racks, fork-lift trucks, and self-propelled hoists. In addition to Efco-Udylite plating plant and processes, the company can supply automatic degreasing and metal cleaning equipment by arrangement with Technochemie A.G., Zurich, and Solventol Chemical Products Inc., Detroit, also automatic polishing machinery with the co-operation of Acme Manufacturing Co., Detroit.

ORDERS AND OUTPUT IN THE ENGINEERING INDUSTRIES.—The volume of net orders received in March by the industries producing engineering and electrical goods (Order VI of the Standard Industrial Classification), locomotives and railway track equipment, railway carriages and wagons, heavy commercial vehicles, and wheeled tractors, was 17 per cent more than in March, 1960, and for the first quarter of the year, the increase was 6 per cent. Export orders rose in March, but for the quarter they were 3 per cent less than in the corresponding period of 1960. On the other hand, home market demand for plant and machinery in particular has shown a marked expansion in the early months of this year.

It is estimated that the volume of output in the engineering and electrical goods industries in March was 2 per cent higher than in March, 1960, and that for the quarter the rise was 3 per cent. Exports of goods (volume) made by these industries in the first quarter were 15 per cent more than in the corresponding period of 1960.

New Appointments

The following new appointments have been announced:—

MR. ERIC TURNER as chairman of the Birmingham Small Arms Co., Ltd., in succession to MR. JOHN Y. SANGSTER who continues to be a director.

MR. S. H. IRELAND as assistant managing director, MR. L. S. BRIGHT as financial director, and MR. A. O. MILLER as director of Consolidated Pneumatic Tool Co., Ltd., 232 Dawes Road, London, S.W.6.

MR. J. J. MCCORMICK and MR. F. W. WESTCOMBE, joint sales managers, and MR. IAN A. F. CRAIG, overseas manager, as local directors of The British Wagon Co., Ltd., 13 Grosvenor Crescent, London, S.W.1.

MR. S. G. DEAVES, a director of B.T.R. Industries, Ltd., as chairman for 1961-62 of the British Moulded Rubber Hose Manufacturers' Association, 19-20 Berners Street, London, W.1.

MR. T. H. GALLIE (overseas) and MR. J. R. H. CRANE (copper products), as directors of the Metals Division of Imperial Chemical Industries, Ltd., Millbank, London, S.W.1.

MR. F. B. G. SAMMONS, A.M.I.Prod.E., as sales manager, MR. G. SEARLE, as technical sales representative for Yorkshire and the North Eastern counties, and MR. J. BRADY as technical sales representative for Lancashire, Cheshire, and the North Western counties, of the Moore Manufacturing Co., Ltd., Blanche Street, Laisterdyke, Bradford.

MACHINERY'S ENQUIRY BUREAU

For many years MACHINERY has provided an enquiry service not only for subscribers and advertisers but for all engineers in need of such information as the names of makers—or their agents—of machines or equipment for performing particular operations, suppliers of various classes of material, firms with facilities for undertaking certain types of work, owners of trade names, and agents for foreign machine builders. If you have such a problem write (MACHINERY, Enquiry Bureau, Clifton House, 83-117 Euston Road, London, N.W.1) or telephone (Euston 8441, 2 lines). This service is, of course, entirely free.

The Price of a Subscription to MACHINERY is 52 Shillings per annum, post free, to any part of the world.

Subscribers are not bound for any definite period of subscription. We send MACHINERY, post free, each week until told to stop. Subscribers can pay yearly, half-yearly, or quarterly, pro rata. (Cash with order.)

To MACHINERY, National House, 21 West Street, Brighton, 1.

Please send me/us MACHINERY every week until I/we tell you to stop, for which I/we enclose remittance of 52 Shillings per annum or pro rata

Name .....

Address .....

.....

**Position* .....

**Firm* .....

*For our mailing records only.

MACHINERY can be obtained by single copies or subscription through your local newsagent.

7/6/61

MANUSCRIPTS FOR BOOKS covering all branches of engineering production will receive careful consideration and should be sent to the Manager, Book Dept., MACHINERY, National House, 21 West Street, Brighton, 1.

CONDITIONS OF SALE AND SUPPLY.—MACHINERY is sold subject to the following conditions:

That it shall not, without the written consent of the publishers first given, be lent, resold, hired out or otherwise disposed of by way of trade except at the full retail price of 1s. 3d. and, that it shall not be lent, resold, hired out or otherwise disposed of in a mutilated condition or in an unauthorised cover by way of trade; or affixed to or as part of any publication or advertising literary or pictorial matter whatsoever.

Wakefield Memorial Lecture

The third Wakefield Memorial Lecture was recently delivered to a meeting of the College of Aeronautical and Automobile Engineering, Kings Road, Chelsea, London, S.W.3, by Mr. Alick Dick, managing director, Standard-Triumph International, Ltd.

Speaking on the subject of education, Mr. Dick pointed out that, although the country wanted large numbers of highly-trained technicians, there was also a demand for skilled administrators with a sound knowledge of the purpose and economics of industry, of finance, and of human relations. It was necessary to teach these basic principles of management rather than to expect people to acquire them, but, at present, there was no specific degree course covering management studies, in any university in the U.K. In the United States, however, the majority of universities had faculties specializing in business studies and management.

In Great Britain, the intake of staff into industry was largely confined to technically-trained people, but it was Mr. Dick's view that more students of the arts should be selected to strengthen the commercial side of business. The training which was received by arts students, he considered, was ideal for potential management staff. Such students learned to work out problems for themselves and to draw the appropriate conclusions, and this training was invaluable in making decisions in any field.

Trade Publications

CHAPHONE ENGINEERING DEVELOPMENTS, LTD., Sutton Coldfield, Warwickshire. Illustrated brochure describing the company's type CV2 and CV3 multi-purpose vertical hydraulic honing machines. Attention is drawn to the various features of the design, and specifications are included. In addition, particulars are given of Chaphone rigid hydraulic honing units.

MISAL S.a.S. LETO, Via Vittor Pisani, 14, Milan, 508, Italy. Catalogue covering the company's manufacturing programme for 1961 which comprises numerous centre lathes; turret lathes; universal and vertical milling machines; shapers; surface, universal, and tool cutter grinders; slotters ; hacksawing machines ; and radial drills. The various machines are illustrated and specifications are included.

ASSOCIATED ELECTRICAL INDUSTRIES, LTD., Electronic Apparatus Division, New Parks, Leicester. Publication 4103-1 describes the Numeritrol system for continuous numerical control of machine tools in two or three dimensions, from ¼-in. wide magnetic tape. Sections are devoted to basic principles; features of the system; the planning sheet; equipment associated with the machine tool; and tape service.

W. & T. AVERY, LTD., Soho Foundry, Birmingham, 40, have introduced a new publication entitled "Survey." In the first issue, which is noteworthy for the high standard of presentation and illustration, there are articles concerned with various applications of the company's weighing equipment at the works of Petters, Ltd., Fairey Aviation, Enfield Rolling Mills, Ltd., Victoria Flour Co., Ltd., and Hamilton Brush Co. (London), Ltd.

JOSEPH RHODES & SONS, LTD., Wakefield. Catalogue describing in detail, with numerous illustrations, the company's range of patented fluid drive shears which covers capacities from 14-gauge by 6 ft. to 1 in. by 16 ft. Sections are devoted, for example, to maintenance, controls, productivity, 2-speed drive, precision, hold-down, gauging equipment, blades, and bevel edge cutting. Another publication is concerned with the Rhodes stagger-feed press for producing stampings from sheets at speeds up to 180 strokes per min. It is stated that the average time required for changing over to a stamping of a different size is 35 min.

Scrap Metals

†LONDON.—‡Prices per ton for non-ferrous scrap metals free from iron are as follows:—Clean copper wire, untinned and free from lead and solder, £210; clean heavy copper, untinned and free from lead and solder, £205; copper wire No. 2, £201; clean light copper, £197; braziery copper, £176; gunmetal, £184; brass, mixed, £136; lead, net, £52; zinc, £43; cast aluminium, £93; old rolled aluminium, £96; battery lead, £27; unsweated brass radiators, £110; hollow pewter, £555; black pewter, £435.

MIDLANDS.—Fluctuations in market prices of copper have resulted in the present value of non-ferrous scrap being slightly lower, merchants viewing the future with a certain amount of caution. Although trading in general remains steady, there may be a doubt existing that the upward trend of recent weeks will be maintained. Metal is changing hands freely with keen price competition for all parcels which are offered.

Tin continues strong, concern over supplies resulting in firm demand. Solder and pewter scrap are finding ready outlets at higher prices.

General indications of metals affected by market conditions are as follows:—

Copper.—Prices show little change, with all grades readily accepted by users. Large and small quantities are moved quickly to take advantage of the existing high tone of the market.

Brass.—Mixed brass remains firmly in demand, brass rod swarf commanding no better price at present.

Gunmetal.—The tone of this metal and allied grades continues good, with prices £1 to £2 per ton higher.

Lead.—A weak market, which provides little hope of future improvement. Prices have dropped by £2 to £3 per ton, mainly due to production exceeding demand. Outlets are available, but prices do not cause much enthusiasm, since they allow only a very small margin of profit.

Aluminium.—No change in prices, and hopes of better trading are still slow to materialize. Old rolled and cast scrap are of almost equal value. Prices offered for aluminium swarf are not too attractive.

Zinc.—Slightly less interest, prices easing by £1 to £2 per ton. Zinc die casting scrap is favoured by most buyers.

† George Cohen, Sons & Co., Ltd., 600 Wood Lane, London, W.12.
‡ Subject to market fluctuations.

Machine Tool Share Market

Dullness and irregularity in price movements, with a generally lower trend, characterised most sections of the stock markets during the period under review. The gilt-edged section was depressed, and, for the most part, British Government stocks displayed a sagging tendency. At the same time, home corporation and dominion loans lost ground, but some improvement was shown towards the close.

Unsettled conditions prevailed in the commercial and industrial sections, which were affected by persistent small selling and a slackening of demand, also by several unfavourable items of company news. An easier tendency developed, and prices for the most part finished at the lowest, although scattered good features have been in evidence.

Among machine tool issues Edgar Allen lost 1s. 3d. at 44s. 6d.; Asquith Machine Tool 9d. at 11s. 6d.; Birmingham Small Arms 3s. at 31s.; British Oxygen 2s. at 23s. 6d.; Broom & Wade 3s. at 24s. 9d.; Chas Churchill 1½d. at 9s. 7½d.; Clarkson Engineers 2s. 6d. at 42s. 6d.; Coventry Gauge & Tool 1½d. at 33s. 7½d.; Craven Bros. (Manchester) 7½d. at 10s. 7½d.; John Harper 3d. at 8s. 6d.; Alfred Herbert 1s. at 77s. 6d.; Ambrose Shardlow 7½d. at 69s. 4½d.; Stedall & Co. 3d. at 8s. 7½d.; and Tap & Die Corporation 3d. at 19s. On the other hand A. A. Jones & Shipman advanced 9d. to 30s.; and W. E. Norton (Holdings) 1s. 9d. to 11s. 3d.

BROOKE TOOL MANUFACTURING CO., LTD. Interim dividend of 5 per cent.

BIRMINGHAM SMALL ARMS CO., LTD. Interim dividend of 4 per cent.

SANDERSON KAYSER, LTD. Final dividend of 12½ per cent, making, with the interim, a total distribution of 17½ per cent. for 1960.

New Companies Registered*

HERTFORD PRECISION ENGINEERS, LTD., 1 Stadium Buildings, Rye House, Hoddesdon, Herts. Registered April 4, 1961. Nom. cap.: £10,000 in £1 shares. Directors: W. A. G. Hill and G. V. Hill.

FUTURMILL-DENFORD LTD., 7 St. George's Square, Huddersfield. Registered May 17, 1961. To carry on business by arrangement with and to the requirements of Futurmill (Conversion) Ltd., as designers, manufacturers of and dealers in machinery, tools, etc. Nom. cap.: £1,000 in £1 shares. Directors: H. S. F. Denford and G. H. R. Denford.

* From the lists compiled by Jordan & Sons, Ltd., Company Registration Agents, 116-118 Chancery Lane, London, W.C.2.

COMPANY		Denom.	Middle Price
Abwood Machine Tools, Ltd.	Ord.	1/-	2/6
Allen (Edgar) & Co., Ltd.	Ord.	£1	44/6
" "	5% Prf.	£1	13/6*
Arnott & Harrison, Ltd.	Ord.	4/-	16/-
Asquith Machine Tool Corp., Ltd.	Ord.	5/-	11/6
" " "	6% Cum. Prf.	£1	16/6xd
Birmingham Small Arms Co., Ltd.	Ord.	10/-	31/-xd
" " "	5% Cum. "A" Prf.	£1	14/6
" " "	6% Cum. "B" Prf.	£1	17/-
" " "	4% 1st Mort. Deb.	Stk.	90½xd
British Oxygen Co., Ltd.	Ord.	5/-	23/6
" " "	6% Cum. Prf.	£1	20/6
Brooke Tool Manufacturing Co., Ltd.	Ord.	5/-	10/3
Broom & Wade, Ltd.	Ord.	5/-	24/9
" "	6% Cum. Prf.	£1	16/6
Brown (David) Corporation, Ltd.	5¼% Cum. Prf.	£1	16/-xd
Buck & Hickman, Ltd.	6% Cum. Prf.	£1	17/-
Butler Machine Tool Co., Ltd.	Ord.	5/-	16/3
" " "	5% Cum. Prf.	£1	14/3xd
Churchill (Charles) & Co., Ltd.	Ord.	2/-	9/7½
" " "	6% Cum. Prf.	£1	25/4½‡
Clarkson (Engrs.), Ltd.	Ord.	5/-	42/6
Cohen (George), 600 Group, Ltd.	Ord.	5/-	14/6
" " "	4½% Cum. Prf.	£1	12/6
Coventry Gauge & Tool Co., Ltd.	Ord.	10/-	33/7½
" " "	5% Cum. Red. Prf.	£1	16/3
Craven Bros. (Manchester), Ltd.	Ord.	5/-	10/7½
Elliott (B.) & Co., Ltd.	Ord.	1/-	3/7½
" "	4½% Red. Cum. Prf.	£1	12/-xd
Firth Brown Tools, Ltd.	4% Cum. Prf.	£1	11/-
Greenwood & Batley, Ltd.	Ord.	10/-	27/-
Harper (John) & Co., Ltd.	Ord.	5/-	8/6
" " "	4½% Red. Cum. Prf.	£1	11/9
Herbert (Alfred), Ltd.	Ord.	£1	77/6
Holroyd (John) & Co., Ltd.	"A" Ord.	5/-	22/6xd
" "	"B" Ord.	5/-	20/6xd
Jones (A. A.) & Shipman, Ltd.	Ord.	5/-	30/-
" "	7% Cum. Prf.	5/-	4/9xd
Kearney & Trecker-C.V.A., Ltd.	5½% Red. Cum. Prf.	£1	11/-
"	Prefd. Ord.	£1	13/9
Kearns (H. W.) & Co., Ltd.	Ord.	5/-	25/-
Kerry's (Gt. Britain), Ltd.	Ord.	5/-	10/7½xd ex rights
Macready's Metal Co., Ltd.	Ord.	5/-	17/-xd
Martin Bros. (Machinery), Ltd.	Ord.	2/-	2/6
Massey (B. & S.), Ltd.	Ord.	5/-	12/-
Newall Engineering Co., Ltd.	Ord.	2/-	11/9
Newman Industries, Ltd.	Ord.	2/-	6/3
" "	6% Prf. Ord.	5/-	5/-
Noble & Lund, Ltd.	Ord.	2/-	6/-
Norton, W. E. (Holdings), Ltd.	Ord.	2/-	11/3
Osborn (Samuel) & Co., Ltd.	Ord.	5/-	58/-
" "	5½% Cum. Prf.	£1	23/-
Pratt (F.) & Co., Ltd.	Ord.	5/-	18/9xd
Sanderson Kayser, Ltd.	Ord.	10/-	40/-
" "	6½% Cum. Prf.	£1	17/-
Scottish Machine Tool Corporation, Ltd.	Ord.	4/-	12/3
Shardlow (Ambrose) & Co., Ltd.	Ord.	£1	69/4½
Shaw (John) & Sons, Wolverhampton, Ltd.	Ord.	5/-	20/-
Sheffield Twist Drill & Steel Co., Ltd.	Ord.	4/-	20/-xd
" " "	5% Cum. Prf.	£1	14/3
Stedall & Co., Ltd.	Ord.	5/-	8/7½
Sykes (W. E.), Ltd.	"B" non-voting Ord.	10/-	32/6
Tap & Die Corporation, Ltd.	Ord.	5/-	19/-
" " "	4½% Deb. 1961-1977	Stk.	82½xd
Wadkin, Ltd.	Ord.	10/-	26/-xd
Ward (Thos. W.), Ltd.	Ord.	£1	83/6
" "	5% Cum. 1st Pref.	£1	14/-
" "	5% Cum. 2nd Pref.	£1	22/6
Willson Lathes, Ltd.	Ord.	1/-	3/4½

The Middle Prices given in the list are in several cases nominal prices only and not actual dealing prices. Every effort is made to ensure accuracy, but no liability can be accepted for any error. * Sheffield price. ‡ Birmingham price.

BRITISH MACHINE TOOL

Exports of New Machine Tools

Countries	Bar and Chucking Automatics		Vertical Boring Machines		Other Boring Machines		Drilling Machines		Gear-cutting Machines		Grinding, Lapping and Honing Machines		Capstan and Turret Lathes		Other Lathes	
	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £
Commonwealth																
South Africa	—	—	183 (1)	6,352	—	—	220 (66)	4,646	—	—	161 (14)	5,185	162 (4)	6,895	515 (26)	20,679
India	—	—	1,089 (1)	60,754	735 (2)	13,644	1,710 (21)	57,018	—	—	1,055 (39)	48,715	1,008 (22)	44,324	251 (19)	9,407
Pakistan	—	—	293 (2)	8,104	—	—	81 (1)	3,115	—	—	12 (1)	224	29 (2)	1,387	—	—
Australia	405 (3)	28,856	—	—	136 (3)	8,499	489 (15)	15,956	—	—	1,012 (36)	45,789	687 (26)	28,462	1,897 (64)	65,960
New Zealand	31 (1)	5,419	—	—	—	—	55 (7)	1,536	—	—	161 (30)	7,826	177 (4)	7,279	624 (41)	19,676
Canada	—	—	338 (1)	10,350	6 (1)	959	3 (1)	95	—	—	541 (15)	21,158	35 (2)	2,519	237 (9)	9,522
Miscellaneous	—	—	—	—	7 (2)	593	188 (40)	5,771	—	—	204 (15)	8,320	—	—	325 (22)	9,712
Foreign																
Soviet Union	—	—	101 (1)	10,722	—	—	—	—	54 (2)	4,331	226 (3)	20,151	—	—	171 (2)	5,865
Sweden	—	—	—	—	—	—	1 (1)	109	—	—	166 (3)	7,438	883 (18)	41,798	323 (26)	15,898
Norway	—	—	—	—	—	—	5 (5)	155	—	—	44 (2)	1,975	11 (1)	835	32 (7)	1,255
Denmark	—	—	—	—	—	—	186 (2)	3,843	—	—	16 (2)	743	47 (2)	3,020	31 (9)	1,608
Western Germany	39 (1)	2,000	—	—	90 (1)	1,834	116 (29)	2,024	—	—	105 (4)	5,798	164 (5)	4,175	692 (43)	29,594
Netherlands	—	—	—	—	—	—	346 (16)	9,262	—	—	78 (9)	3,207	272 (6)	7,021	—	—
Belgium	—	—	100 (1)	3,230	42 (1)	3,213	22 (21)	815	—	—	329 (5)	8,731	305 (6)	10,492	45 (9)	1,579
France	—	—	—	—	—	—	1 (1)	90	27 (1)	3,048	181 (5)	6,603	81 (1)	4,540	18 (1)	1,669
Switzerland	—	—	—	—	—	—	96 (6)	4,721	—	—	116 (7)	6,235	171 (5)	13,325	248 (77)	13,000
Spain	—	—	—	—	—	—	639 (4)	16,320	—	—	160 (6)	13,847	—	—	33 (1)	2,325
Italy	470 (2)	31,559	—	—	63 (1)	3,828	28 (1)	3,130	—	—	326 (12)	23,760	242 (2)	16,844	20 (12)	804
U.S. America	157 (1)	7,727	—	—	—	—	81 (5)	1,995	—	—	1,013 (14)	34,604	63 (2)	1,633	691 (36)	28,118
Miscellaneous	356 (2)	22,253	130 (1)	4,812	249 (4)	20,362	1,602 (57)	34,912	616 (10)	41,437	1,211 (44)	74,863	475 (15)	23,026	882 (56)	45,683
Total	1,458 (10)	97,814	2,224 (8)	104,324	1,328 (15)	52,932	5,869 (299)	165,513	697 (13)	48,816	7,117 (266)	345,172	4,812 (123)	217,575	7,035 (460)	282,354

Total exports of reconditioned machine tools:—Quantity: No., 86; Weight, 4,239 cwt.; Value, £39,347.
Total exports of imported machine tools:—Quantity: Weight, 1,438 cwt.; Value, £45,904.

Imports of New Machine Tools

Country of Origin	Bar and Chucking Automatics		Vertical Boring Machines		Other Boring Machines		Drilling Machines		Gear-cutting Machines		Grinding, Lapping and Honing Machines		Capstan and Turret Lathes		Other Lathes	
	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £
Sweden	—	—	—	—	—	—	118 (7)	2,721	55 (1)	4,106	861 (12)	49,317	—	—	47 (1)	1,668
Western Germany	155 (4)	7,768	9 (3)	289	1,194 (3)	37,586	70 (20)	4,714	199 (4)	17,797	1,887 (55)	97,116	856 (26)	59,102	1,535 (19)	49,936
France	260 (2)	8,715	16 (1)	3,733	—	—	8 (4)	201	—	—	—	—	12 (1)	591	251 (7)	10,454
Switzerland	211 (18)	31,141	26 (1)	3,627	44 (2)	4,560	13 (2)	752	4 (1)	729	237 (13)	23,318	123 (2)	10,782	687 (22)	43,315
U.S. America	433 (2)	23,517	14 (2)	1,300	—	—	8 (1)	1,210	4,945 (25)	345,333	1,880 (35)	218,199	142 (2)	9,396	827 (11)	52,525
Miscellaneous	20 (2)	682	41 (1)	2,828	282 (4)	10,828	282 (29)	10,801	250 (2)	5,258	412 (28)	14,453	—	—	846 (74)	28,525
Total	1,079 (28)	71,823	106 (8)	11,777	1,520 (9)	52,974	499 (63)	20,399	5,453 (33)	373,223	5,277 (143)	402,403	1,133 (31)	79,871	4,193 (134)	186,423

Total imports of reconditioned machine tools:—Quantity: No., 36; Weight, 3,220 cwt.; Value, £67,284.

IMPORTS AND EXPORTS (Classified)

and Parts during February, 1961

Milling Machines		Presses		Sheet-metal Working Machines		Sawing Machines		Screwing and Threading Machines		Planing, Shaping and Slotting Machines		Unit Transfer Machines and Heads		Other Machines		Machine Tool Parts*		Total	
Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt.	Value £	Quantity. Cwt. and No.	Value £
52 (2)	3,138	867 (12)	14,541	354 (8)	5,471	61 (24)	1,275	79 (3)	3,817	122 (4)	3,499	—	—	131 (15)	3,835	578	21,168	3,485 (179)	100,501
62 (4)	2,982	124 (20)	6,133	2 (1)	98	—	—	315 (3)	22,181	854 (1)	19,629	—	—	1,237 (21)	57,014	846	33,737	9,288 (154)	375,636
—	—	—	—	—	—	—	—	—	—	—	—	—	—	20 (2)	793	73	1,496	498 (8)	15,119
739 (18)	37,156	353 (10)	10,640	623 (11)	15,626	173 (5)	4,453	213 (6)	14,345	394 (12)	14,976	—	—	829 (21)	42,258	2,205	113,677	10,175 (230)	446,653
111 (4)	4,491	229 (11)	3,729	72 (5)	1,921	63 (14)	1,712	—	—	173 (11)	6,115	—	—	16 (1)	705	65	4,377	1,777 (129)	64,786
618 (10)	32,082	11 (1)	160	322 (3)	6,018	8 (2)	176	—	—	66 (2)	3,150	—	—	142 (1)	1,999	2,100	32,387	4,427 (48)	120,575
21 (1)	1,223	224 (7)	11,514	155 (12)	3,109	122 (28)	3,713	28 (3)	1,471	55 (5)	1,541	—	—	112 (14)	3,448	781	35,799	2,222 (149)	86,214
—	—	—	—	114 (2)	10,550	—	—	—	—	—	—	—	—	—	—	6	3,726	672 (10)	55,345
45 (1)	1,459	—	—	—	—	4 (1)	247	—	—	—	—	—	—	228 (6)	14,592	87	9,328	1,737 (56)	90,869
—	—	—	—	58 (1)	1,147	—	—	—	—	—	—	—	—	— (1)	97	39	3,003	189 (17)	8,467
—	—	—	—	—	—	22 (1)	434	21 (1)	1,582	—	—	—	—	3 (1)	48	44	4,879	370 (18)	16,157
832 (14)	26,386	7 (1)	693	117 (3)	9,173	7 (1)	902	252 (8)	18,444	18 (2)	1,498	—	—	50 (2)	10,274	70	7,583	2,559 (114)	120,378
40 (2)	1,442	247 (8)	12,957	10 (1)	81	—	—	193 (3)	10,568	7 (1)	177	—	—	35 (1)	1,194	241	13,409	1,469 (47)	59,318
184 (2)	10,928	39 (5)	2,083	19 (1)	749	11 (1)	248	—	—	—	—	—	—	16 (3)	640	557	8,660	1,669 (55)	51,368
—	—	206 (19)	7,181	46 (1)	2,368	—	—	20 (1)	1,582	20 (2)	492	—	—	4 (2)	518	189	16,107	793 (34)	44,198
114 (3)	5,521	459 (1)	8,408	—	—	—	—	20 (1)	1,772	—	—	12 (1)	793	41 (1)	3,085	41	3,491	1,318 (102)	60,351
—	—	—	—	—	—	—	—	—	—	—	—	—	—	44 (2)	4,425	32	2,000	908 (13)	38,917
710 (3)	35,696	1,781 (3)	30,715	—	—	—	—	—	—	—	—	—	—	24 (1)	3,183	72	6,282	3,736 (37)	155,801
—	—	40 (1)	1,001	38 (5)	4,127	4 (1)	162	—	—	62 (1)	2,242	—	—	536 (10)	18,354	245	13,995	2,930 (76)	113,958
703 (12)	37,931	530 (18)	16,963	772 (12)	30,733	17 (4)	353	233 (4)	22,600	593 (16)	19,064	—	—	4,837 (99)	162,828	487	32,943	13,693 (354)	590,763
4,251 (76)	200,435	5,117 (117)	126,718	2,702 (66)	91,171	492 (82)	13,675	1,374 (33)	98,362	2,364 (57)	72,383	12 (1)	793	8,305 (204)	329,290	8,758	368,047	63,915 (1,830)	2,615,374

Figures in parentheses denote number of machines. * Not including machine tool cutting parts.

and Parts during February, 1961

Milling Machines		Presses		Sheet-metal Working Machines		Sawing Machines		Screwing and Threading Machines		Planing, Shaping and Slotting Machines		Unit Transfer Machines and Heads		Other Machines		Machine Tool Parts*		Total	
Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt. and No.	Value £	Quantity. Cwt.	Value £	Quantity. Cwt. and No.	Value £
24 (1)	1,264	—	—	71 (2)	2,374	—	—	5 (1)	353	17 (13)	1,122	—	—	—	—	95	10,640	1,293 (38)	73,565
1,621 (28)	79,098	1,248 (17)	33,409	206 (27)	5,762	479 (38)	16,940	229 (26)	10,898	84 (5)	3,404	1,342 (2)	60,745	3,147 (75)	112,187	297	32,304	14,558 (352)	629,055
899 (19)	42,226	272 (11)	15,591	33 (4)	10,573	4 (1)	274	279 (4)	14,933	—	—	—	—	51 (35)	6,106	152	9,496	2,237 (89)	122,893
435 (13)	31,966	410 (2)	11,999	114 (3)	3,274	—	—	102 (8)	11,562	9 (1)	715	—	—	682 (131)	22,182	207	35,956	3,304 (219)	235,878
975 (9)	83,210	697 (8)	24,400	449 (5)	34,272	30 (1)	1,245	—	—	—	—	—	—	925 (22)	84,339	1,830	174,932	13,155 (123)	1,053,878
779 (20)	24,902	1,451 (28)	37,822	278 (36)	16,050	55 (17)	2,673	11 (1)	1,420	499 (3)	9,347	6 (1)	1,829	744 (20)	41,593	173	13,629	6,129 (266)	222,640
4,733 (90)	262,666	4,078 (66)	123,221	1,151 (77)	72,305	568 (57)	21,132	626 (40)	39,166	609 (22)	14,588	1,348 (3)	62,574	5,549 (283)	266,407	2,754	276,957	40,676 (1,087)	2,337,909

Figures in parentheses denote number of machines. * Not including machine tool cutting parts.

PRICES OF MATERIALS

All prices per ton except where otherwise stated.

Pig Iron

Foundry and Forge No. 3, Class 2

Middlesbrough (10 tons or over)	£21 17 0
Birmingham (10 tons or over)	£21 9 3

Phos. Over 0·1 up to 0·4%

Birmingham (6 ton lots)	£23 5 0
Grangemouth (6 ton lots)	£23 10 0

Hæmatite

English No. 1 (10 tons or over)

N.E. Coast (made in N.E.)	£23 19 0
Scotland	£24 5 6
Sheffield	£25 9 0
Birmingham	£25 13 0

Welsh 10 tons or over £23 19 0

Steel Products

Medium plates (50 tons and over)	£43 16 6
Mild steel plates, ordinary (50 tons and over)	£40 7 0
Boiler plates (50 tons and over)	£42 17 0
Flat bars, 5 in. wide and under (50 tons or over)	£39 1 0
Round bars, under 3 in. (50 tons or over)	£39 1 0
Billets, rolling quality, soft U.T. (100 tons or over)	£31 15 6

Phosphor Bronze

Ingots (2B8) (A.I.D.) d/d	£322 0 0

Copper

Cash (mean)	£244 12 6
Cold rolled and hot rolled sheets 4 ft. by 2 ft. by 10 SWG	£320 5 0
Rods, $\frac{7}{16}$ in. to $\frac{1}{2}$ in. diam.	£338 10 0
Tubes, $1\frac{1}{2}$ in. bore by 10 SWG, ton lots, per lb.	3s. 3½d.
Wire rod, black, hot-rolled ($\frac{1}{4}$–$\frac{9}{16}$ in.), English	£261 2 6

Zinc

Refined, minimum 98 per cent purity, current month (mean)	£81 16 3

Brass

Tubes, solid drawn, basic per lb.	1s. 11½d.
Strip 63/37, 6in. by 10 SWG coils, ton lots	£267 15 0—£270 15 0
Rods, $\frac{1}{2}$–3 in. diam. (59 per cent copper)	2s. 1½d.

Yellow Metal

Condenser plates, per ton	£197 0 0
Rods, per lb.	2s. 2½d.

Aluminium

Ingots, min. 99·5 per cent Canadian d/d	£186 0 0

Tinplates

*U.K. Home trade: Cold reduced, f.o.r. makers works (15-50 tons)	£3 6 8
U.K. Export: Hot rolled basis, f.o.r. works port	73s. 6d.—76s. 0d.
Cold reduced basis, f.o.r. works port	73s. 6d.—76s. 0d.

Gunmetal

Ingots, B.S. 1400 L.G.2, delivered	£232 0 0

* Official maximum price, after allowing for adjustments for increase in price of tin.

MAKERS' PRICES

Hexagon Steel Bars[1]

Sizes in inches from 1 in. up to 2·21 and 2·41 a/f ex works, 2 tons basis	£42 17 0
Free cutting black	£47 6 6

Reeled Steel Bars[1]

Single-reeled, 1½ in. upwards, f.o.t. works (+ usual extra for sizes)	£43 9 6
Free cutting	£47 19 0

Precision-ground Mild Steel[2]

1-in. diam. ± 0·00025-in. 4-ton lots, per cwt.	124s. 6d.

Bright Ground Stainless Steel Bars[3]

EN56AM (martensitic, free cutting)	£304 10 0
EN58AM (austenitic free cutting)	£377 10 0

Prices are basic, subject to extras.

High-speed Steel

Black random length bar. All prices basic, per lb., subject to extras:

Molybdenum "66"	6s. 5d.
Molybdenum "46"	6s. 3d.
14 per cent tungsten	6s. 11d.
16 per cent tungsten	7s. 4d.
18 per cent tungsten	7s. 9d.
22 per cent tungsten	9s. 2d.
5 per cent cobalt	10s. 10d.
4·75/5·25 molybdenum + 6·0/6·75 tungsten + 1·75/2·05 vanadium per cent (5-6-2)	6s. 7d.

Precision-ground, High-speed Free-turning Brass Rod[2]

½-in. diam. ±0·00025-in., 2 ton lots, per lb.	2s. 7½d.

Grey Iron Rod

Die Cast[4] in random lengths 18 in. to 26 in. rough machined $\frac{1}{16}$-in. above listed size. Extra for definite lengths. Discounts for orders over £150.

	Per cwt. net. Mark I	Mark III
¾ or ⅞ in.	260s. 3d.	338s. 3d.
1 or 1¼in.	208s. 4d.	267s. 3d.
1½ to 1¾ in.	146s. 3d.	181s. 7d.
1⅞ to 2 in.	112s. 7d.	133s. 6d.
2¼ to 3¼ in.	97s. 1d.	112s. 9d.
3½ to 12 in.	91s. 9d.	105s. 3d.

Continuous Cast

10-ft. lengths, centreless machined 1 to 3-in. diam. + 0·010 to 0·020 in., prices as quoted for die cast bar[4]

centreless ground 1 or 1⅛ in. +0·010 in. Extra		208s. 4d.
for hardenable alloy iron[5]	1⅛ to 1½ in.	146s. 3d.
	1⅝in. to 2 in.	112s. 7d.
Per cwt. net	2¼ to 3¼ in.	97s. 1d.

Stellite[6]

Welding Rods, plain

¼ in. diam., per lb.	30s. 0d.

Toolbits

¼ in. sq. × 4 in., each	22s. 3d.

[1] Colvilles, Ltd., Glasgow, and 17 Grosvenor Street, London, W.1. [2] Pratt, Levick & Co., Ltd., Chester. [3] Spartan Steel & Alloys, Ltd., St. Stephens Street, Birmingham, 6. [4] Sheepbridge Alloy Castings, Ltd., Sutton-in-Ashfield. [5] "Flocast," Harold Andrews Sheepbridge, Ltd., Halesowen. [6] Deloro Stellite, Ltd., Highlands Road, Shirley, Solihull.

BASIC PRICES FROM LONDON STOCK[6]

Free Cutting Steel

Bright cold drawn: (Usaspead) over 1 to 2 in.	£59 4 6
Lead bearing (Usaled)	£63 11 0
Precision ground, 1¾ in.	£84 14 6

Bright Drawn

M.S. bars (M.M.C.) over 1½ to 2 in.	£56 10 0
Square edge flats (Usaflat)	£73 6 6
M.S. angles (Usaspead)	£100 6 6
Case hardening (EN) (Usacase over 1½ to 2 in.	£62 10 0
M.S. bars (EN3B) (Usamild) over 1½ to 2 in.	£58 16 6
Carbon manganese semi-free cutting case hardening (EN202) (Usaspead 202) over 1½ to 2 in.	£71 5 0
35/45 ton tensile (EN6) (Usen) over 1 to 1½ in.	£67 3 0
0·4 carbon normalized (Usaspead "40") over 1½ to 2 in.	£69 5 0
0·45 carbon normalized EN9 (Usaspead 55)	£69 15 0
Carbon manganese steel to Specification EN16T (Usaspead 5565), per ton	£126 17 0

Ground Flat Stock

18-, 24-, and 36-in. lengths (Usaspeed). List prices plus 10 per cent, less 5 per cent.

Oil Hardening Cast Steel

Non-shrink (Usaspead N.S.O.H.), ¾ in. to 2½ in., per lb.	1s. 11d.
Non-distorting heavy duty (Usaspead H.C.H.C.), ¾ in. to 2¾ in., per lb.	4s. 2d.

Silver Steel

(0·194-in. to 1½-in.)

Genuine Stubs quality, per lb.	4s. 10d. less 27½%
M.M.C. quality, per lb.	2s. 8d. + 6½%
Boxes of 16 assorted sizes, $\frac{1}{16}$ in. to ¾ in. diam.	7s. 6d.

Stainless Steel

KE40AM (free cutting), per lb.	3s. 8d.

Glacier Machined Bronze Bars

Phosphor bronze (2B8) / Lead bronze	Prices on application

High-speed Steel

18 per cent tungsten. Prices on application.

Toolholder bits:

Usaspead "Super" / "Supreme" / Cobalt 10	List price

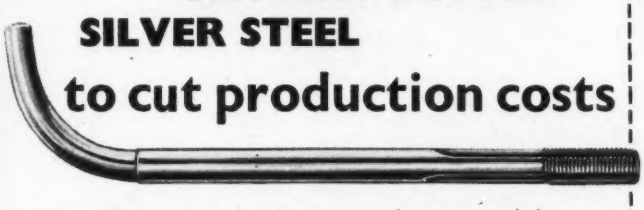
Shimstock

Steel assorted, per tin	3s. 6d.
Brass " "	7s. 3d.

[6] Macready's Metal Co., Ltd., Pentonville Road, N.1. Subject to confirmation by London Office. Delivered free by van in London area.

If you make parts like these, use . . .

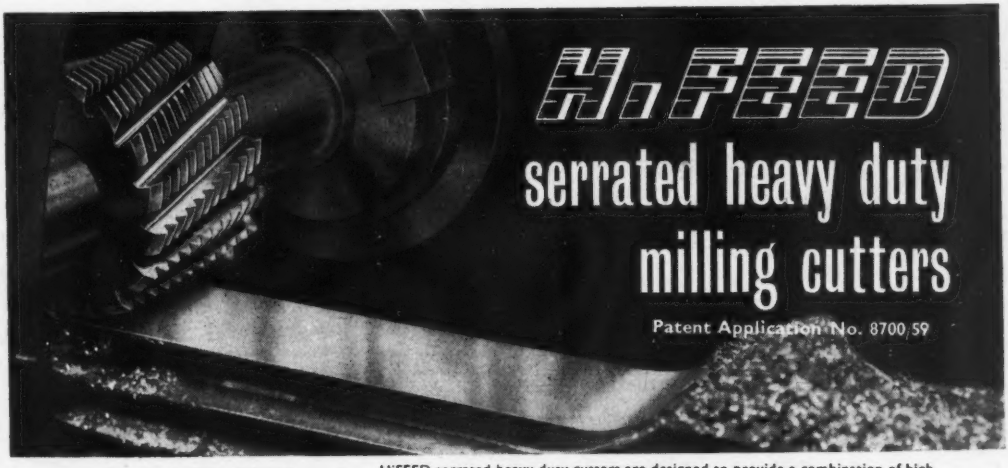
GENUINE P.S. STUBS SILVER STEEL to cut production costs



You get absolute consistency with GENUINE P.S. STUBS SILVER STEEL—you get excellent machineability, easy hardening, lower production costs. There's a size for every job—each one dead accurate.

1 Tap for restricted spaces
2 Die head for automatic machine
3 Circular split die
4 Reamer
5 Plug Gauge
6 Guess what?

PETER STUBS LIMITED
SS43 **WARRINGTON · ENGLAND**



HiFEED serrated heavy duty milling cutters

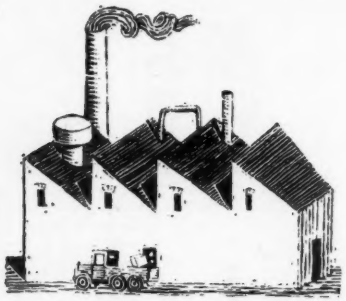
Patent Application No. 8700/59

BRAYSHAW TOOLS LIMITED
BELLE VUE WORKS, MANCHESTER 12.
Phone: EASt 1046 (3 Lines)
Grams: Hardening M/C.

HiFEED serrated heavy duty cutters are designed to provide a combination of high rate of stock removal and good surface finish.

Some of the advantages to be obtained are:—
SINGLE POINT CUTTING EFFICIENCY.
REDUCED LOAD AND VIBRATION on machine and work.
INCREASED PRODUCTION, particularly on work hardening and high tensile materials.
EFFICIENT HEAT DISSIPATION resulting from the break up of the cutting edges enables **HIGHER FEEDS AND SPEEDS** to be employed.

Primarily designed for heavy stock removal HiFEED cutters produce a surface finish acceptable for most applications. An alternative design, offering similar advantages plus superior surface finish when required, is also available.
HiFEED cutters INCREASE production REDUCE costs.
Send to-day for your copy of leaflet S.T.603.

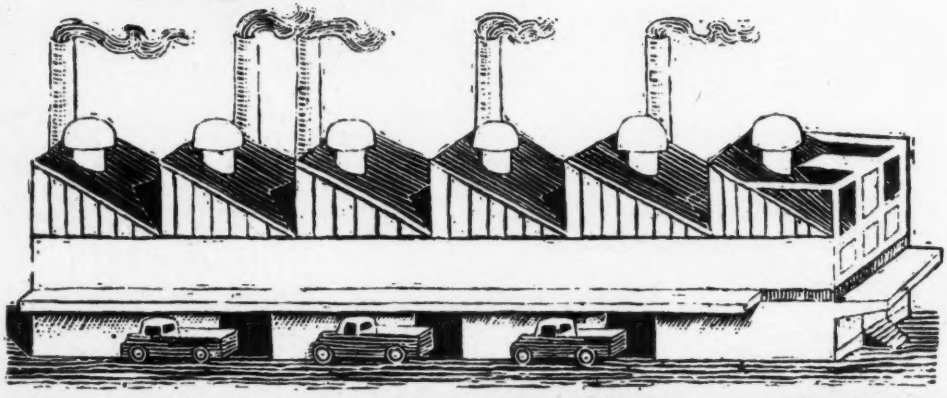


plus

There can be no expansion in a competitive business without the regular addition of the latest machinery and equipment. This is where Mercantile Credit facilities can prove such a vital factor in your development. They enable you to acquire the machinery or plant you need out of income and additional profits, while your essential working capital remains undisturbed.

If you would like more details, please write or telephone to your nearest Mercantile Credit branch.

equals



MERCANTILE CREDIT COMPANY LIMITED

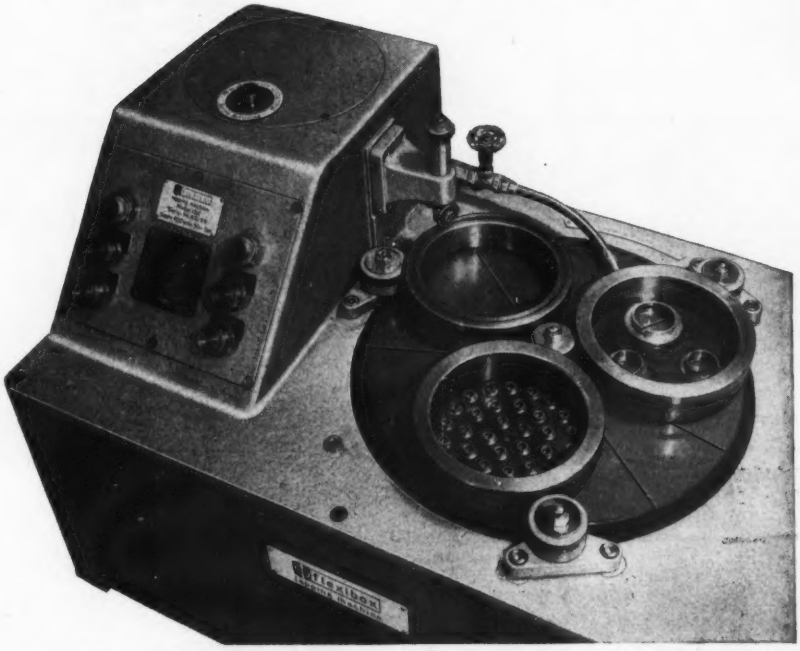
Argyll House, 246-250 Regent Street, London W.1.
Telephone: REGent 7222
Member of the Finance Houses Association

There are Mercantile Credit branches throughout the United Kingdom. Please consult your local telephone directory for your nearest branch.

When answering advertisements kindly mention MACHINERY.

why machine lap?

Firstly because a machine lapping process is fast. Secondly because consistently accurate results are obtained since the lapping plate is continuously reconditioned during operation. All Flexibox lapping machines, for example, are capable of fast lapping to optical standards of flatness and 1 to 5 micro-inches CLA surface finish.



the flexibox range

Model	Max. diameter of work
Model 15A bench lapper	5½ inches
Model IV	7½ inches
Model VA	10½ inches

Larger sizes also available

Typical applications

Semi-conductor slices
Hydraulic & pneumatic components
Engine parts
Mechanical seal faces
Plastic recording heads
Valve plates
Deburring operations etc., etc.

What's your surface finishing problem? Write for leaflets Nos. 1 & 15

FLEXIBOX LIMITED

Head Office and Main Works: NASH ROAD, TRAFFORD PARK, MANCHESTER 17

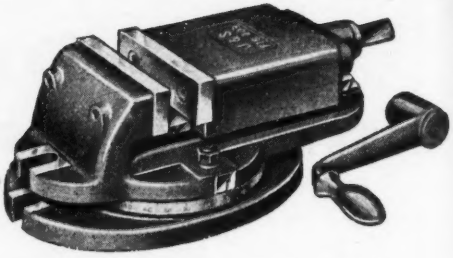
Telephone: Trafford Park 1477 Telegrams: Flexibox Manchester Telex.

A MEMBER OF THE M.O.R. GROUP OF COMPANIES

Agents and representatives in all parts of the world. Patents granted or applied for in all principal countries.

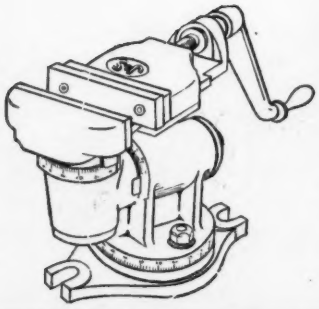
machine vices

The range of J & S Machine Vices covers all kinds from precision types for light grinding operations to heavy duty models for use on Milling and Planing Machines.



Milling Machine Vices are manufactured in two types, plain and swivel, in a variety of capacities. An Angular Sine Vice is available for extreme precision work.

Stock Deliveries from all J & S Small Tool distributing Agents.



J & S

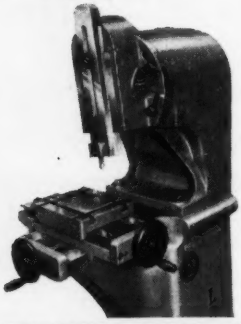
small tools

A. A. JONES & SHIPMAN LTD.,
Narborough Road South, Leicester.
Telephone: Leicester 823222.
Telegrams: "CHUCK" Leicester

J & S

SAVE 25% PRODUCTION TIME!

Leytool 2-inch Stroke Slotting Machine



THE Leytool Slotting Machine is a development of necessity to provide economic manufacture of the 1001 small parts which no other machine can handle. So successful was this machine in their own works that the designers, The Leytonstone Jig and Tool Company, have now developed it to play an invaluable part in both small and large machine shops.
Sturdy, well-built and comprehensive in its uses on production machining of small parts, this machine has accuracy, adaptability and unique features of the greatest possible value in the toolroom. A "great" little machine which in initial cost, production time and trouble-free service offers a 25% overall saving in manufacturing costs of any part.

MARK II This is a simplified version of the Mark I model, constructed from the same heavily designed main castings, but not incorporating the Rotary Table. The two cross slides are hand fed only and the 7in. by 6½in. rectangular Tee Slotted Table is designed primarily to accommodate production tooling.

MARK I This model is fitted with a very serviceable 7in. diameter Rotary Table, which has been specially hardened, ground and graduated. Rapid, precise setting to within 1/1000th of an inch is provided by the accurately ground centre bore and tenon slots.

Designers and Manufacturers: The Leytonstone Jig and Tool Co. Ltd.

Please write for full details to

Gordon Try Ltd.

SOLE DISTRIBUTORS
THE CAUSEWAY, EGHAM, SURREY.
Telephone: EGHAM 4166-7

HANDS FOR INDUSTRY...

LET the various powered movements of the machine be represented by A, B, C, etc. Let the sequence of operations in the cycle be represented as A+B+A−C+A+B−D+C−A−D−E+E−. And let . . . and let . . . . . and let's call in the Martonair Technical Service, which seems to make a habit of doing this sort of thing.

THAT'S MARTONAIR—The first name in applied pneumatics.

Martonair

MARTONAIR LIMITED, Parkshot, Richmond, Surrey.
Telephone: RIChmond 2201. Telex 24330.
Telegrams: Martonair-Richmond-Surrey-Telex.
Cables: Martonair, London.

KINNINGS for Quality

Manufacturers of

BRIGHT STEEL
HEXAGON NUTS
for over 40 years

⅜in. WHIT. S.C. PRECISION COLD FORMED (B.S. 1083) TAKEN FROM NORMAL PRODUCTION.

Unretouched Photograph magnification ×2

ARNOLD KINNINGS & SONS LTD
Bright Hexagon Bolt, Nut and Screw Manufacturers
NORWOOD ROAD · SOUTHPORT · LANCS

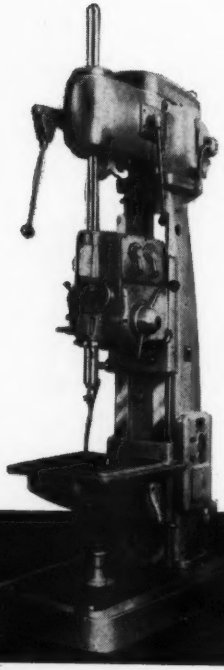
Telephone:
SOUTHPORT 3182 (3 lines)

V.40

UPRIGHT DRILLING MACHINE

- CAPACITY 1⅛" IN STEEL 2" IN CAST IRON
- DRILLS TO CENTRE OF 30"
- 12 SPINDLE SPEEDS
- 2 SPEED MOTOR 3 & 4 H.P.
- WEIGHT 28 CWT.
- SLIDING HEAD AND TABLE RISE AND FALL

EXCLUSIVE DISTRIBUTORS IN THE U.K.
IMMEDIATE DELIVERY AND INSPECTION AT



TIMES
THE TIMES MACHINERY CO. LTD.
Poyle Road, Colnbrook, Slough, Bucks.
Telephone: Colnbrook 2442

H.P 8386

June 7, 1

New method of unit construction enables these GRAFFENSTADEN

New method of unit construction enables these

GRAFFENSTADEN

PRODUCTION MILLERS to be tailored to your exact requirements

Built with a century of 'KNOW-HOW'

★ ***FEATURES AVAILABLE INCLUDE***

Single and duplex types with horizontal and vertical heads.
Fully automatic cycles.
Automatic clamping of head and quill.
Backlash eliminators.
Swivelling and sliding ram available for horizontal spindle.
Hardened table ways.
Ward Leonard type drive.

Electro magnetic copying units for contour milling.

AVAILABLE WITH VARIOUS TABLE SIZES

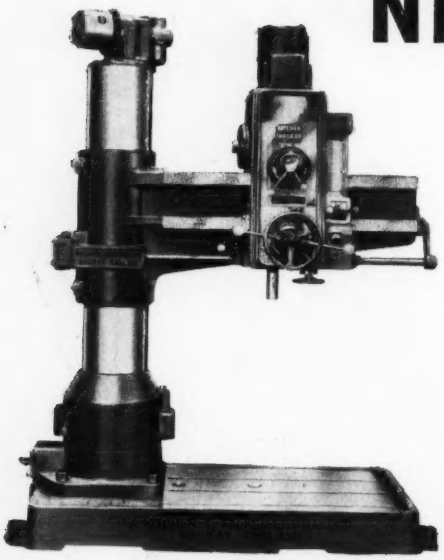
offered exclusively in the U.K by

ACBARS LTD

57a HOLBORN VIADUCT · LONDON · E.C.1

Telephone : CENtral 6811/2 — 2287/8/9

When answering advertisements kindly mention MACHINERY.



NEW AND BETTER

HIGH PERFORMANCE

RADIAL DRILLS By

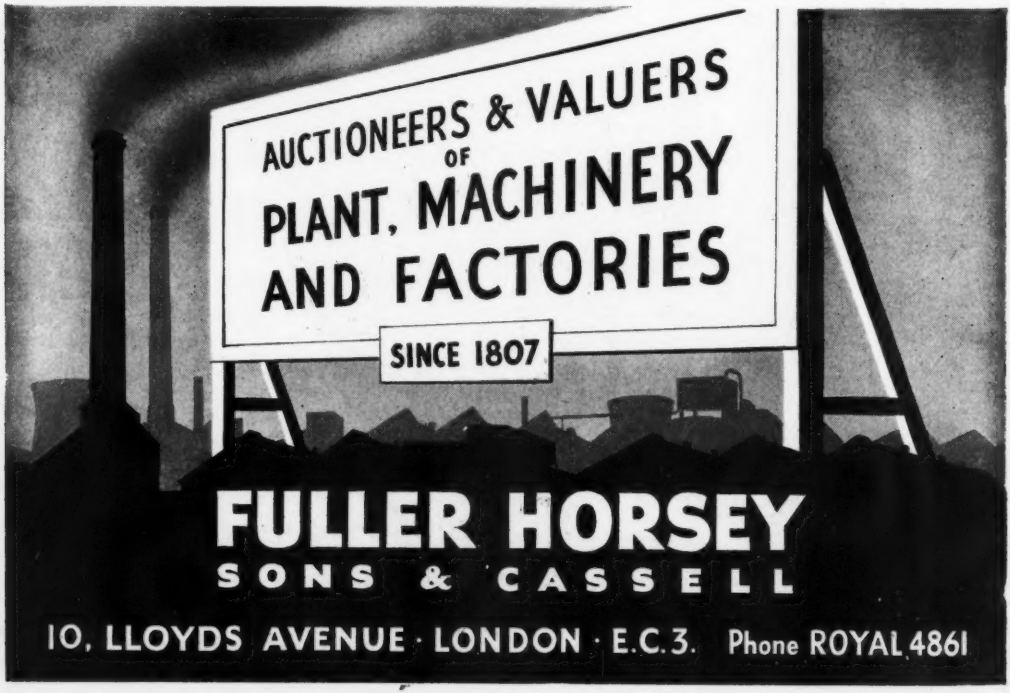
KITCHEN-WALKER

18 SPEEDS **9 FEEDS**

MODEL E2 3ft. 0in. to 5ft. 0in. radius 2in. Capacity.
MODEL E3 4ft. 0in. to 6ft. 0in. radius 3in. Capacity.
4ft. 0in. model E2 Shown.

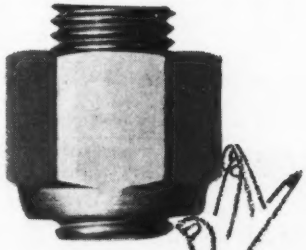
A. KITCHEN-D. WALKER LTD. PELLON LANE **HALIFAX** ENGLAND

Telegrams : RADIAL, HALIFAX Telephone : HALIFAX 67824



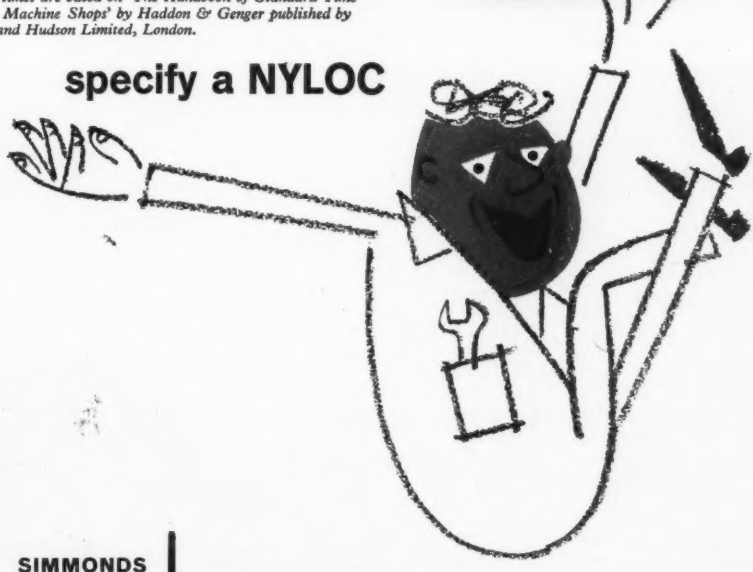
. . . when everything depends on a nut

A lot can depend on a single nut—safety, efficiency, your reputation as a manufacturer. If that's the sort of exacting role the nut has to play, there are six good reasons why you should choose a Nyloc: * Nylocs are self-locking anywhere on the bolt thread. * Nylocs stand up to shock, vibration, oil, corrosives and extremes of temperature. * Nylocs can be used again and again. * Nylocs don't damage the bolt thread. * Nylocs have no extra bits and pieces to fit or get lost. * Nylocs save time and money (it takes 40 minutes to assemble 100 $\frac{1}{4}''$ Nylocs as against 60 minutes to assemble 100 $\frac{1}{4}''$ full nuts and jam nuts*). If you want still more reasons, send for the Nyloc brochure—it's free and includes complete tables of all Nyloc types, sizes, threads, materials and finishes.



** These times are based on 'The Handbook of Standard Time Data for Machine Shops' by Haddon & Genger published by Thames and Hudson Limited, London.*

specify a NYLOC



SIMMONDS AEROCESSORIES LIMITED

TREFOREST, PONTYPRIDD, GLAMORGAN
Branches: LONDON · BIRMINGHAM · MANCHESTER · STOCKHOLM
COPENHAGEN · BALLARAT · SYDNEY · JOHANNESBURG · NAARDEN
MILAN · NEW YORK · BRUSSELS AND MANNHEIM

A MEMBER OF THE FIRTH CLEVELAND GROUP

CRCS2N

resistance drilling with the DUMORE

Used as single unit automatic drill press

AUTOMATIC DRILL HEAD

"Resistance drilling" with the Dumore speeds small hole production and virtually eliminates drill breakage as the resistance of the work-piece determines feed and speed. Constant, uniform pressure of the drill permits maximum metal removal without exceeding the breaking point of the drill. Completely automatic, the Series 20 Drill Head leaves operator's hands free.

Chuck Capacity 0-$\frac{1}{2}$" Voltage 115v AC
Length of Stroke 1$\frac{1}{4}$"

Built-in Rotary Air Compressor. No air line required—plug drill head cord into electrical outlet.

Automation Ltd.

DEVONSHIRE HOUSE, VICARAGE CRESCENT, LONDON, S.W.11
Tel. BATTERSEA 5549

MARLOW VERTICAL MILLING MACHINES

• Backgeared Head 85-1,500 r.p.m. 6 speeds. • 5 speed Direct Drive, 375-2,250 r.p.m. available on Models 1, 2 and 3. • All models have Swivel Head. • Power feed available as an extra on all models except 1 and 2. • Down Feed Head, hand operated, available on Models 4 and 5 and Turret Mills.

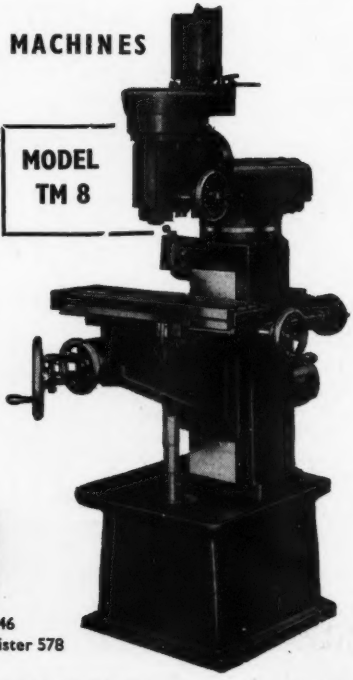
STANDARD MILLS

Model	Table	Table to Spindle
1	22in. by 6$\frac{1}{2}$in.	16in.
2	28in. by 6$\frac{1}{2}$in.	16in.
3	28in. by 8in.	15in.
4	28in. by 8in.	19in.
5	28in. by 10in.	19in.

MARLOW TURRET MILLS

Radial and Sliding Arm, Swivelling and Down Feed Head. Power Feed to table optional.

Model	Table	Table to Spindle
T.M.8	28in. by 8in.	19in.
T.M.10	28in. by 10in.	19in.



MODEL TM 8

VICTA ENGINEERING CO.
Head Office THICKET CORNER MAIDENHEAD Phone 50.

London Area: Eagle Works, Chester Road, Boreham Wood, Herts. Tel: ELS 3146
Southern: Eagle Works, Blandford Road, Hamworthy, Poole. Tel: Lytchett Minister 578

Give me a Burdett every time! Why?

Because I want a good production bonus: that means high output and trouble-free running. I want accuracy and quality — rejects are no good to me. I want controls where I can get at them easily and quickly. I want a machine that's safe and easy to keep in trim. Just what I say, when it's surface grinding, give me a Burdett.

MODEL 70. 18" x 6".
Acknowledged to be the most powerful 18" x 6" Surface Grinder made. Capable of the heaviest stock removal and at the same time, the best possible surface finish and the highest accuracy.

MODEL 75. 24" x 8".
Heavy cuts will not disturb the settings of the specially designed spindle and bearings. All working parts fully protected and serviced with ease.

MODEL 77. 24" x 12".
Latest addition to the range. Has all the features of the other models plus extra grinding width for dies and press tools.

G.W.S. BURDETT & CO. LTD.
EASTGATE PETERBOROUGH
Telephone 4871

Known and used throughout the World

T&J REAMERS

ADJUSTABLE SOLID MACHINE REAMERS

SOLID MACHINE REAMERS

MACHINE EXPANSION REAMERS

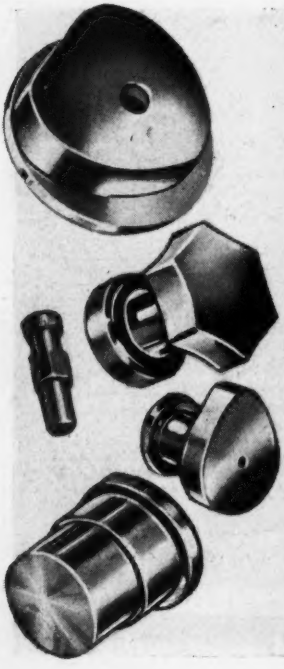
Illustrated Catalogues supplied on request

STANDARD BRITISH TOOLS • MADE IN ENGLAND BY

TAYLOR & JONES LTD

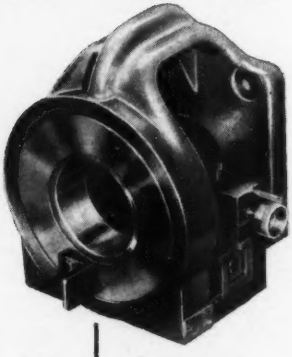
HONLEY • NR: HUDDERSFIELD

PHONES: HONLEY 61336/7 • GRAMS: GAUGES·HONLEY·HUDDERSFIELD



Shaped to a TURN with the CHATWIN polygon tool box

This lathe attachment will turn hexagon, octagon, square or other shapes from round stock and drill when necessary in ONE OPERATION. It will bore holes for perfect matching to most shapes and is a must for economical production of curved triangular drive components in particular.



THOS. Chatwin & CO.

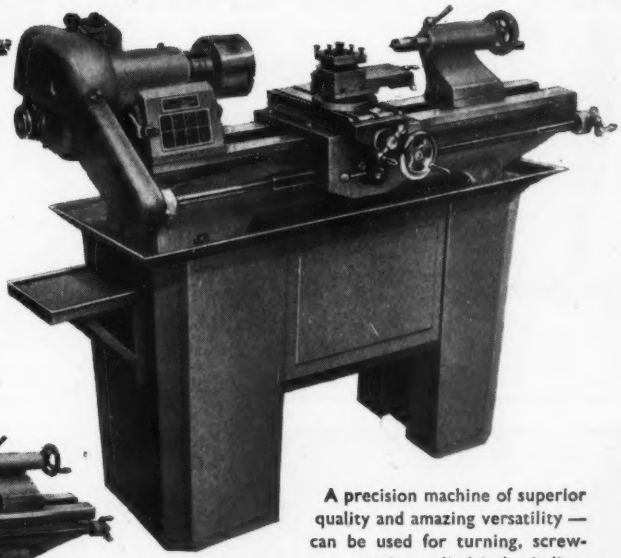
Gt. Tindal St.
Manchester, 16.
Tel:
Edgbaston 3521

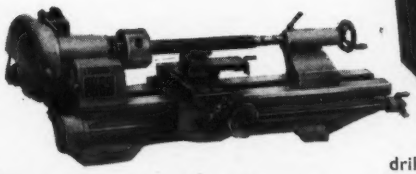
Area Sales Offices in:—
LONDON, BRISTOL, MANCHESTER & NEWCASTLE.

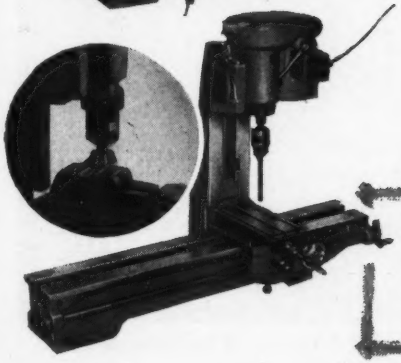
Maximat

THE NEW AND OUTSTANDING MULTI-PURPOSE 10" PRECISION LATHE

New—one machine that does the work of many with tool room standards of precision. Gives you maximum use from limited space in tool rooms, machine shops, training schools and industrial laboratories. Ideal for small production runs — converts in minutes from a bench lathe to a vertical miller, drill or jig borer.







A precision machine of superior quality and amazing versatility — can be used for turning, screw-cutting, cylindrical grinding, drilling or milling! Hand-scraped bedways — conversion to miller, etc., by means of exclusive vertical column — large multi-purpose milling-fixture table—micrometer collar on headstock quill—headstock spindle features rack and pinion feed with spring-action return—precision ground leadscrew—cam-action tailstock.

Height of centres	5"	Headstock quill feed ...	1 9/16"
Admits between centres ...	24"	Tailstock spindle travel ...	3¼"
Spindle bore	9/16"	Taper in spindle-tailstock	M.T. No. 2
Spindle speeds (7)	110-1700 r.p.m.		
Longitudinal feed per rev. ...	·0015" and ·005"	Net weight	250 lb.
		Space required ...	48" x 19"

MAXIMAT offers you all these features at an unbeatable price — why not write and see for yourselves, to the sole British agents:—

LANCING MACHINE TOOLS LIMITED

Commerce Way · Lancing · Sussex Tel Lancing 3410

use the

'PAREX'

for fast

BAR CHAMFERING

at low cost!

Available for pneumatic operation, the PAREX ensures fast and accurate chamfering on tubes as well as bars. Capacity is ¼ in. to 2⅜in. dia. (6-67 m/m).

Write today for fully descriptive brochure.

G. ZWICKY (LONDON) LTD.

193 VICTORIA ST., LONDON, S.W.1. TEL: VICTORIA 0370, 5301

SUMMIT
MILLING CUTTERS - SLITTING SAWS
REAMERS - GEAR CUTTERS - HOBS
END MILLS - PARTING OFF TOOLS
CIRCULAR SHEARING CUTTERS
BEVEL KNIVES - CIRCULAR FORM TOOLS

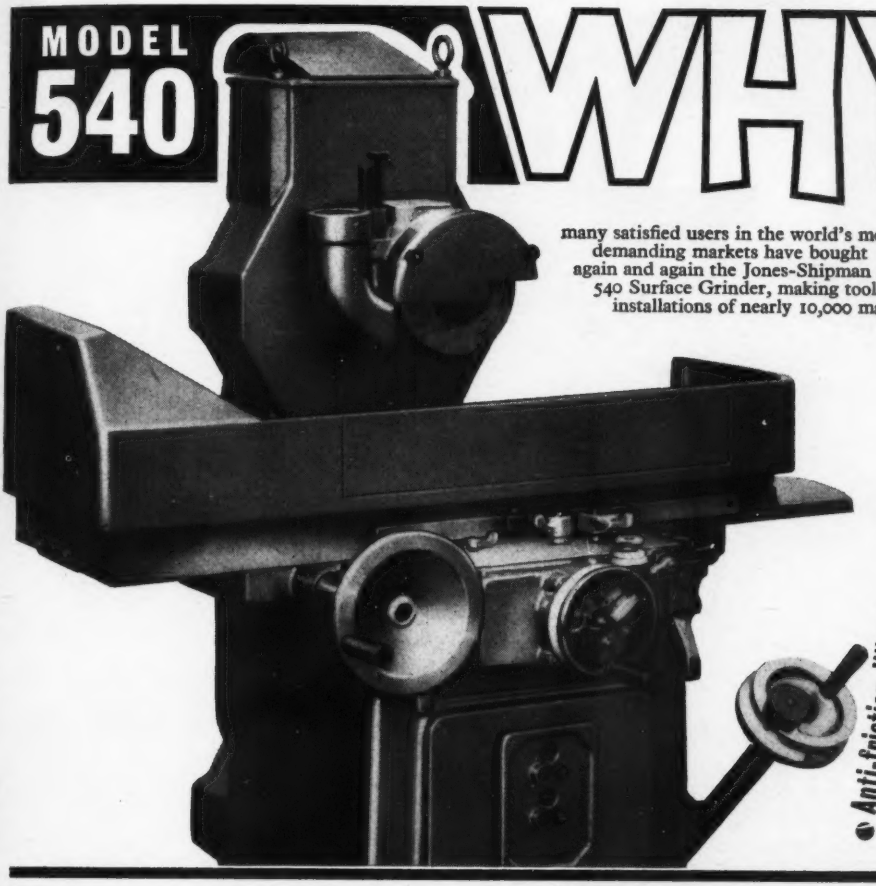
JOSEPH THOMPSON (SHEFFIELD) LIMITED

Townhead Street Engineering Works, Sheffield 1. England Telephones: 24021 (Three lines) Telegrams: "Summit, Sheffield"

MODEL 540

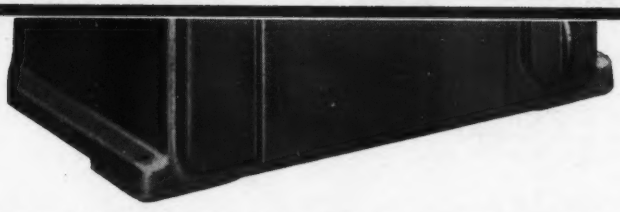
WHY

many satisfied users in the world's most demanding markets have bought again and again the Jones-Shipman Model 540 Surface Grinder, making tool installations of nearly 10,000 machines.

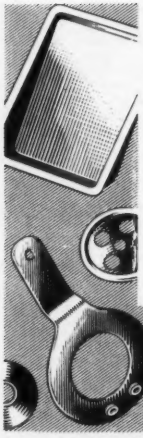


- Anti-friction Wheelhead Slide
- Power Rise and Fall to Wheelhead (optional)
- Patented Single Valve Block Hydraulic Assembly
- Positive Cross-Feed Mechanism
- Completely Centralised Control
- Low Pressure, Long Life Hydraulic System

JONES & SHIPMAN



A. A. JONES & SHIPMAN LTD. LEICESTER. Tel. 823222 *London Office, 50-52 Great Peter Street, London, S.W.1 Tel.- ABB 5908-9*



Capstan and Automatic Work and Sheet Metal Pressings in any metal, any finish, any quantity.

GRIFFITHS, GILBART, LLOYD,
AND COMPANY LIMITED
EMPIRE WORKS,
PARK ROAD,
BIRMINGHAM, 18
TELEPHONE NORthern 8221

STANDARD
OAKALOY
TUNGSTEN CARBIDE TIPPED
TOOLS
—for longer life

The comprehensive range of OAKALOY Tungsten Carbide Tipped STANDARD tools includes Turning, Boring, Facing, Recessing, Parting, Planing, Forming tools, etc. . . . . IN FACT STANDARD TOOLS TO MEET EVERY REQUIREMENT . . .

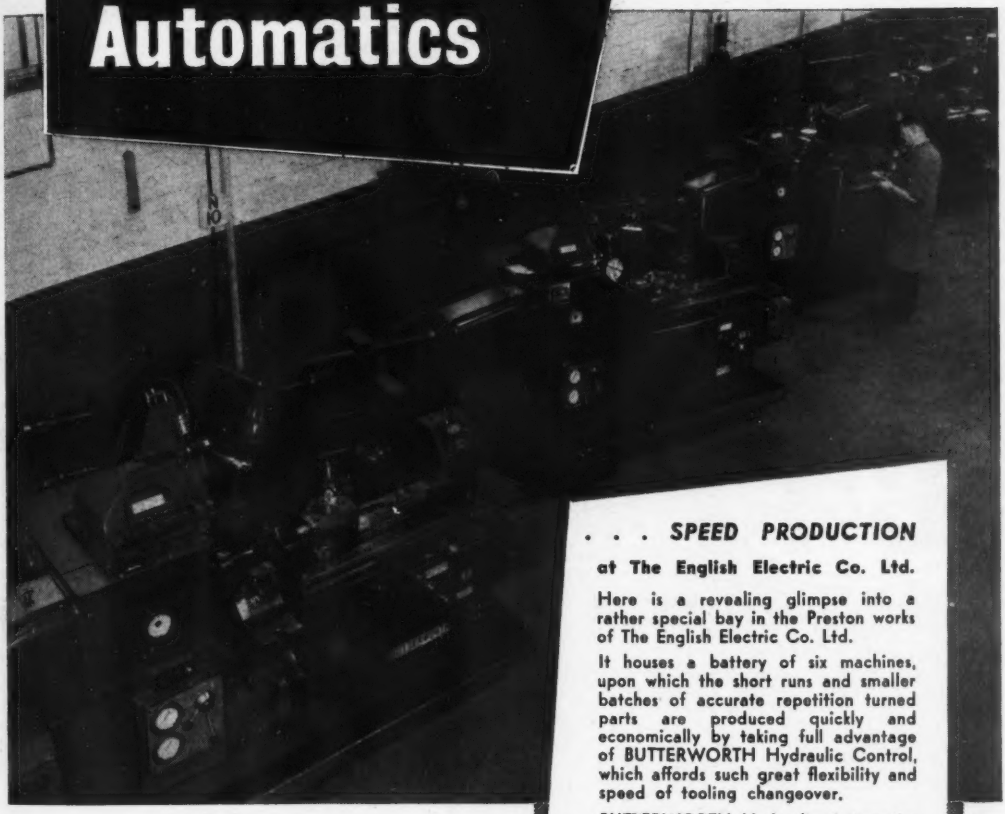
LITERATURE ON REQUEST

COMPLETE TECHNICAL SERVICE AT YOUR SERVICE

LENCHS
(B'HAM LTD.)
BARR STREET, BIRMINGHAM 19
Telephone: NORthern 8421 (4 lines)

PROMPT DELIVERY

Butterworth British Automatics



. . . **SPEED PRODUCTION**

at The English Electric Co. Ltd.

Here is a revealing glimpse into a rather special bay in the Preston works of The English Electric Co. Ltd.

It houses a battery of six machines, upon which the short runs and smaller batches of accurate repetition turned parts are produced quickly and economically by taking full advantage of BUTTERWORTH Hydraulic Control, which affords such great flexibility and speed of tooling changeover.

BUTTERWORTH Hydraulic Automatics are designed for bar or chucking work between 1⅛" and 3½" maximum diameter, with attachments for hydraulic copy turning and cross slide longitudinal turning available, if required.

BUTTERWORTH Hydraulic Controlled Automatics are supplied in the following Spindle Capacities, 1⅛", 2", 2½" and 3" Light Duty, and 3" and 3½" Full Duty and for Light Chucking Work.

Write for complete details—

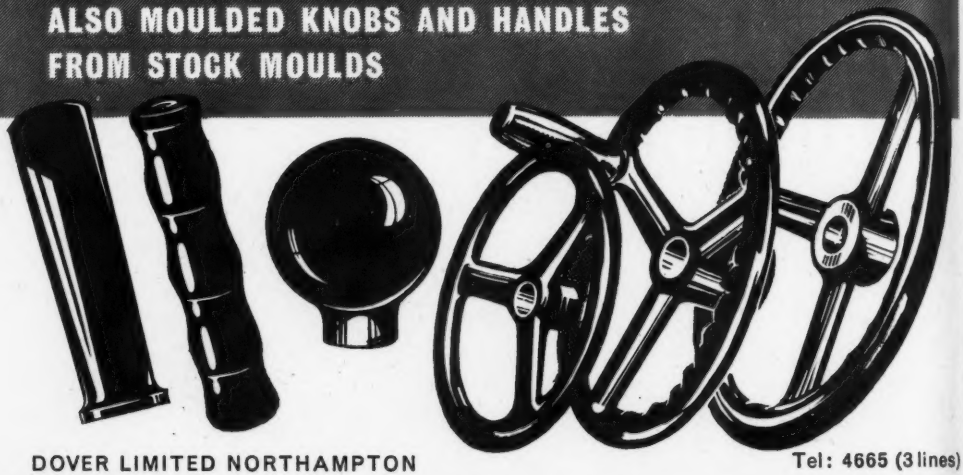
BUTTERWORTH BRITISH AUTOMATIC MACHINE TOOL CO., LTD.

LINCOLN STREET : ROCHDALE

DOVER LIMITED

HAND CONTROL WHEELS

ALSO MOULDED KNOBS AND HANDLES FROM STOCK MOULDS



DOVER LIMITED NORTHAMPTON

Tel: 4665 (3 lines)

B&T SHIM WASHERS

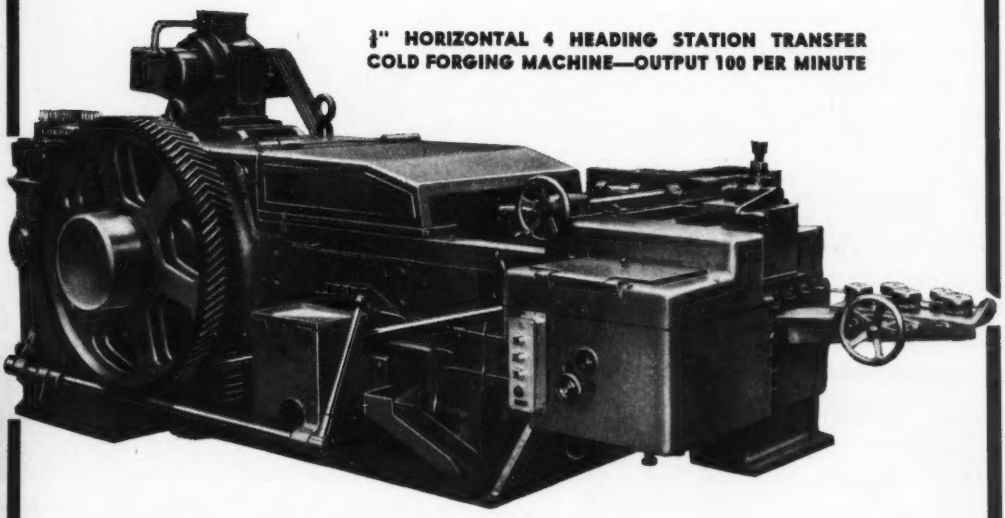
★

Made in diameters from ⅛" to 10" with bores to suit, and any quantity, material, brass, or steel shim stock, in thicknesses between .002" and .06". Also laminated shims up to 6" dia. Tab washers and shims of irregular shapes can also be produced. We shall be pleased to receive your enquiries.

BONEHAM & TURNER LTD MANSFIELD NOTTS PHONE 896

GREENBAT COLD FORGING MACHINERY

⅜" HORIZONTAL 4 HEADING STATION TRANSFER COLD FORGING MACHINE—OUTPUT 100 PER MINUTE



This ⅜" Horizontal 4-station transfer Cold Forging Machine has an output of 100 per minute. It will cut off lengths of 4½" with a cut-off capacity of 9/16" diam. on high tensile steel wire. Special features include the punch and die ejectors, fitted with electrical safety devices so that in the event of a tooling failure the machine is stopped almost instantaneously by motor plug brakes working in conjunction with a powerful band brake. The machine is fully automatically lubricated and can be supplied with a variable speed drive.

Also available is a complete range of standard and high speed, single and double blow, open and solid die cold forging machines; reheading and trimming machines; thread rolling machines, etc.

Advice willing given on any manufacturing problems connected with cold or hot forging.

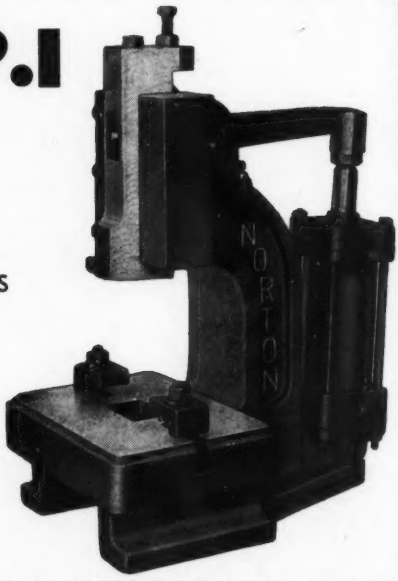
GREENWOOD & BATLEY LTD.

ALBION WORKS LEEDS ENGLAND

When answering advertisements kindly mention MACHINERY.

O2

The NORTON A.P.I AIR PRESS



★ **ONE TON CAPACITY**

FOR ALL FORMS OF RAPID LIGHT BLANKING PIERCING, RIVETING AND ASSEMBLING OPERATIONS

Powered by a 3in. dia. cylinder, it gives a one ton blow on an air line pressure of 80 lbs. p.s.i.

FOR HAND OR FOOT OPERATION

STROKE (ADJUSTABLE) ..... 0 TO 1in.
BASE TO RAM WHEN UP ..... 6in.
CENTRE TO BACK ..... 3½in.

T. NORTON & CO. LTD.

MANUFACTURERS OF HAND, FOOT & ARBOR PRESSES FOR OVER 50 YEARS
CARVER STREET, BIRMINGHAM, 1. Phone CENtral 4325/9. Grams NOTRONCO, B'ham

from the widest range of all !

You can now choose air power equipment from the combined ranges of Bellows and Valvair. Most comprehensive choice there is! Fast, flexible, safe . . . Bellows-Valvair Equipment is production-proved on a multitude of jobs.

Write for combined range booklets!

Bellows-Valvair

CONTROLLED AIR POWER EQUIPMENT

BELLOWS-VALVAIR LTD., 1206, STRATFORD ROAD, HALL GREEN, BIRMINGHAM 28. Tel: Springfield 6059

❋ 'Penetral' treated

Cyanide Pots SAVE Money

. . . reports from a large number of our customers confirm our claim that pressed steel pots treated by our 'Penetral' Impregnation process frequently last over 1,000 hours and, under favourable conditions, 2,000 hours have been achieved.

some reasons why ----------

1. *Pressed steel pots are homogenous and will not leak.*
2. *'Penetral' treatment resists oxidation for temperatures up to 1000°C.*
3. *Initial cost is much lower than cast pots.*
4. *Lowest cost per hour.*
5. *Supplied regularly to leading motor firms, specialist heat treatment plants, machine and small tool industries.*
6. *Standard sizes for all Cassel and G.L.C. type furnaces.*

Follsain-Wycliffe FOUNDRIES LTD

LUTTERWORTH, Nr. RUGBY Tel: LUTTERWORTH 10, 60 or 152
617 Cogent

The Specialist Firm for
HEAT-RESISTING and
ABRASION-RESISTING
ALLOY CASTINGS & METALS
for Gas, Electricity and
Steel Undertakings.
Mining and Quarrying Plant
Cement, Brick, Pipe & Tile Works
Heat Treatment Plants.

When answering advertisements kindly mention MACHINERY.

HAVE WE SENT YOU A COPY?

This brochure contains :

* Full information on the properties and applications of Hard Chromium and Heavy Nickel deposits

* Invaluable guidance on the Machining and Grinding of these metals

It is of vital interest to all

Engineers,
Buyers,
Designers,
Draughtsmen,
Inspectors, etc.

Write now to:—

THOMAS TRY LTD. (EST. 1835)

CAMBRIDGE YARD, HANWELL, LONDON, W.7

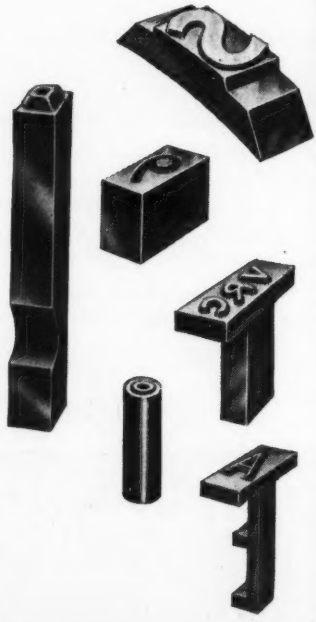
Telephone EALing 0740

SPECIALISTS IN

STEEL TYPE——

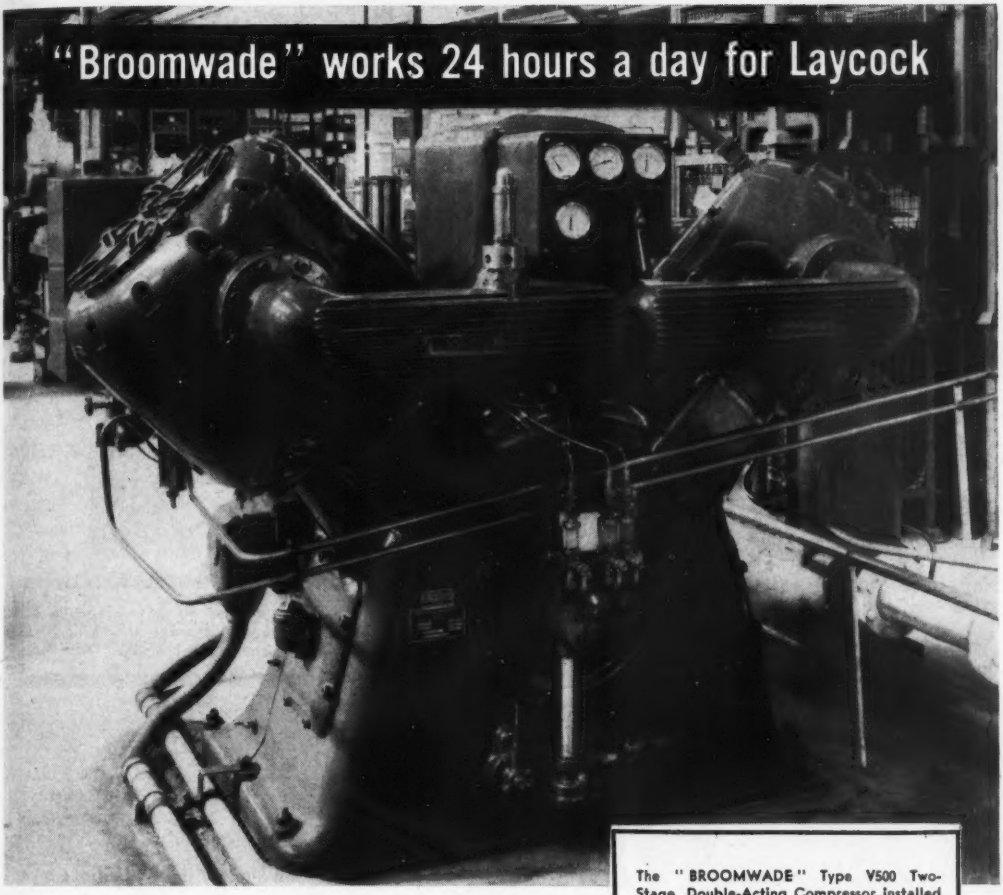
long
short
round
square
thick
thin
awkward shapes

Standard type for engineers too.
Send for catalogue



J. H. SHAND LTD. Axminster · Devon · Tel : Axminster 3114

"Broomwade" works 24 hours a day for Laycock



Over 13 months ago, Messrs. Laycock Engineering Limited—the famous manufacturers of automobile components including the Laycock-de Normanville Overdrive — installed one of the latest "BROOMWADE" Type V500 Air Compressors at their Sheffield works.

Driven by a direct coupled electric motor, thus occupying the minimum of floor space, this compressor of advanced design has operated with complete satisfaction 24 hours per day, for 5 days a week, including many week-ends.

The V type 90° arrangement of the cylinders provides excellent running balance and this, coupled with the absence of vibration, enables the complete unit to be bolted to the factory floor without special foundations.

Here, indeed, are valuable economies — COMPACTNESS, LOW INSTALLATION and MAINTENANCE COSTS plus RELIABILITY. They pay off handsomely at Laycocks — they could do the same for you.

The "BROOMWADE" Type V500 Two-Stage, Double-Acting Compressor installed at the Victoria Works of Messrs. Laycock Engineering Ltd. Delivering 525 c.f.m. of free air at 100 p.s.i., this compact unit provides a round-the-clock supply of compressed air for air chucking, air fixtures, clamping, indexing, operating hand-held pneumatic tools, and air hoists. The compressed air supply is also used for mixing and agitating the neutralising and pickling baths; for shot blasting; for metal and paint spraying; for air-cooling oil quenching baths; for clearing fumes; and for operating roof ventilators.

Photograph by courtesy of Messrs. Laycock Engineering Limited.

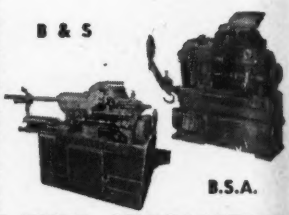
Write today for full details

"BROOMWADE"

AIR COMPRESSORS AND PNEUMATIC TOOLS · YOUR BEST INVESTMENT

Broom & Wade Ltd., P.O. Box No. 7, High Wycombe, Bucks. Telephone: High Wycombe 1630 (10 lines) Telex: 83—127 873 SAS

MELBOURNE

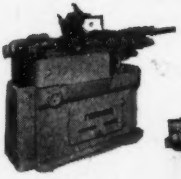


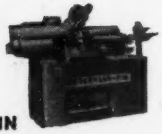
THE SPECIALISTS IN THE REBUILDING OF TURRET TYPE AUTOMATICS

Can now offer

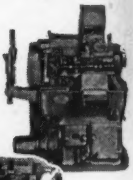
THE SAME UNSURPASSED RE-BUILDING SERVICE FOR SWISS-TYPE AUTOMATICS

BECHLER


TORNOS


PETERMANN

- Machines are rebuilt to original specification of accuracy and limits.
- All parts fitted are interchangeable with maker's spares.
- Reconditioning not only costs less than a new machine but can also be charged wholly as a maintenance expense ranking for full tax relief.
- We can loan a machine equivalent to the one taken out thereby assuring customer of his continuity of production.


C.V.A.

INDEX

★ May we visit your works and quote for reconditioning your machine?

MELBOURNE ENGINEERING CO. LTD., MELBOURNE, Near DERBY

(H. E. SLAWSON, M.B.E., M.I.P.E., Man. Director) Tel: MELBOURNE 232

Thos. Wm. Lench Ltd.

PHONE: BLACKHEATH 1151

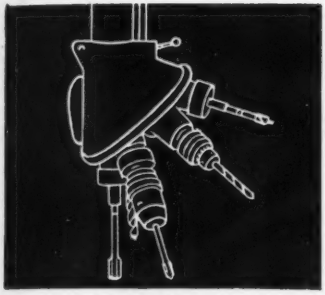
BLACKHEATH
BIRMINGHAM
ENGLAND.

GRAMS: LENCHONIA, BLACKHEATH, BIRMINGHAM

MAKERS OF

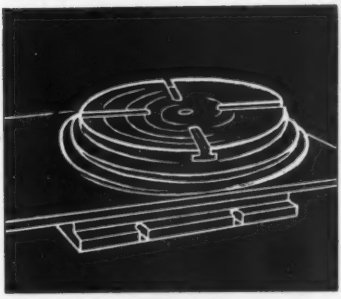
Bolts, Screws, Rivets.

Helping to cut your Drilling Costs



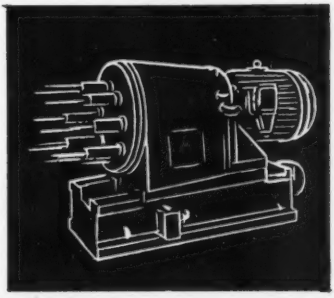
MULTIDRILL AND TAPPING HEADS

with fixed or adjustable spindle centres, for mounting on drilling machines or as self-contained units, with or without automatic feed cycle. Tapping with or without lead screw control.



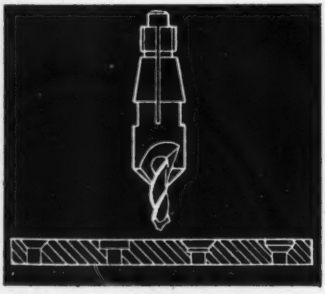
ARBO AUTOMATIC TURRET DRILL HEAD

2-7 stations, choice of 10 speeds and separate depth stop for each station. Tapping by reversing spindles and positive or friction drive. Automatic indexing, ⅜in. or 1in. drilling capacity.



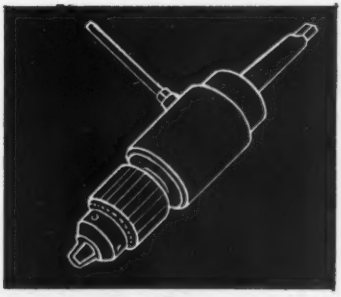
THOKA FLOATING COMPOUND TABLE

saves handling time and jig cost. Floats on air for fingertip positioning, locked by air pressure during drilling. 12in. and 18in. table diameters. Arranged for indexing, can be set quickly to any P.C.D.



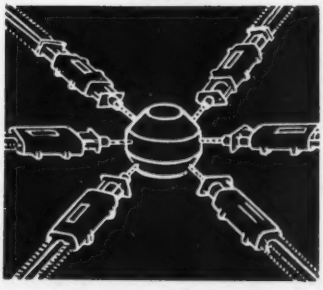
COMMANDER MULTI-ANGLE DRILL UNITS

low priced compact units for special set-ups for drilling at odd angles, re-set rapidly for another job. Flexible shaft drive, self-contained, hydraulic or pneumatic feed system. ⅜in. dia. capacity, 4in. stroke.



PROCEDO COMBINATION COUNTERSINKERS

do two operations in the time of one. Combined drilling and countersinking, counterboring deburring or trepanning, with ordinary twist drills.



COMMANDER DRILL CHIP BREAKER

drills deeper and more accurate holes at higher speeds, by breaking the chips into small fragments. Fewer broken drills and more holes between re-grinds. ¼in. maximum drill size.

THOKA

THOKA MACHINERY SUPPLIES LTD

2 DRAPERS GARDENS · LONDON · E.C.2

'Phone: NATional 7391. Cables: THOKANE, London.

When answering advertisements kindly mention MACHINERY.

ACCURATE and VERSATILE for Toolroom or Batchwork

SWISS **SCHAFFNER W.12**

UNIVERSAL MILLER

Robust. Built for lasting accuracy, with refinements only found on larger, more costly machines. Specially selected anti-friction spindle bearings. Hardened and ground table leadscrew. Scraped slideways. Accurate, easily read scales. Exceedingly versatile — Stepless table feeds 25/64″ to 5⅜″ per min. Stepless speeds 45 to 2640 r.p.m. Change-over from horizontal to vertical milling *in minutes*. 360° swivelling head retractable for bulky work. Slotting, spiral milling and dividing heads available.

Table 30″ x 8″ Traverses: 17″ long., 5⅛″ trans., 10¼″ vertical.

Write for fully illustrated brochure M/233

SOLE U.K. DISTRIBUTORS

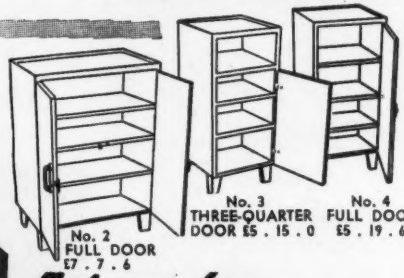
DOWDING & DOLL LTD

346 KENSINGTON HIGH STREET, LONDON, W.14

Tel: WESTERN 8077 (8 lines) *Telex:* 23182 *Grams:* ACCURATOOL LONDON TELEX

233

Tudor **ALL STEEL TOOL & STORAGE CABINETS**



No. 2 FULL DOOR £7 . 7 . 6

No. 3 THREE-QUARTER DOOR £5 . 15 . 0

No. 4 FULL DOOR £5 . 19 . 6

No. 1 THREE-QUARTER DOOR £6 . 18 . 6

No. 5 FULL DOOR LARGE MODEL £11 . 5 . 0

No. 6 CLOTHING LOCKER

Prices on application

MADE IN SCOTLAND

A type for every purpose!

WRITE TODAY FOR FURTHER DETAILS & PRICES

JOHN S. YOUNG & CO. LTD.

TUDOR WORKS, BURNFIELD ROAD, GIFFNOCK GLASGOW. TEL. MERRYLEE 2393 (5 LINES)

TAPE CONTROLLED DRILLING

Look at these advantages

on a Wadkin type TCD1

No Marking Out

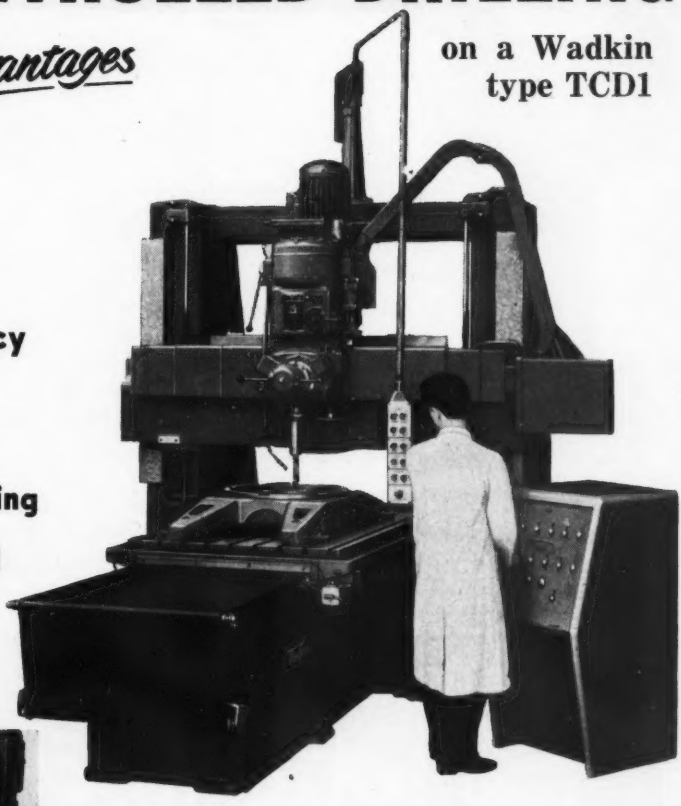
No Drilling Jigs

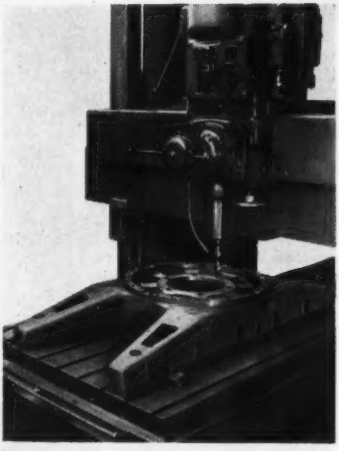
Positional Accuracy to ±·001"

Fully Automatic

Tape or Dial Setting

Reasonably Priced





Wadkin Tape Controlled Drilling Machine drilling a cast-iron rotating slideway.

This machine will accurately position holes up to 2in. diameter in steel. It eliminates all marking off as well as the necessity of using drilling fixtures. Once the tape has been punched — a relatively simple operation — exact repetitions of even the most complicated drilling jobs are guaranteed at any time.

The rigidity of the machine enables maximum diameter drills to be fed directly into steel without the break-through problem normally experienced.

The price of this machine, complete with positioning control system, compares favourably with a conventional drilling machine of the same capacity.

May we send you more details?

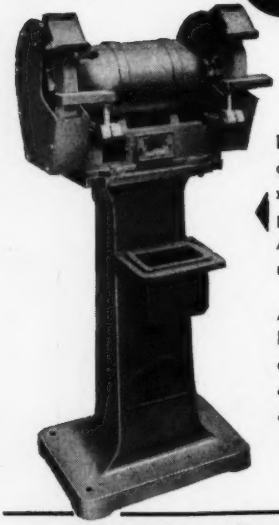
Wadkin

SPECIALISTS IN HIGH SPEED MACHINE TOOLS

Wadkin Ltd., Green Lane Works, Leicester. Tel: 68151. London Office: 62 Brook St., W.1. Tel: MAYfair 7048

GRIMSTON

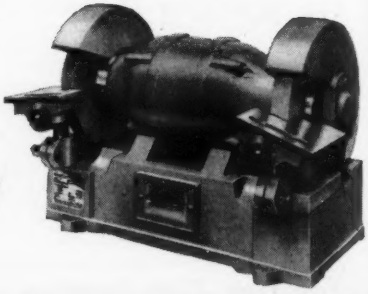
For tool and general grinding . . .



Designed and built for general duty, this double ended machine has 12" diameter x 1½" wheels, adequately guarded and provided with adjustable work rests. Available as illustrated or for bench mounting.

Also suitable for bench or pedestal, this low priced machine with 8" wheels, is designed for grinding tungsten carbide and high speed tipped tools. Angle adjustment tool tables are provided.

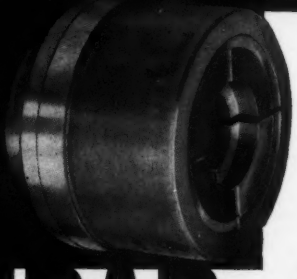
Ask for details, quoting Ref. M17.



GRIMSTON ELECTRIC TOOLS LTD. PROGRESS WAY, CROYDON, SURREY

PHONE: CROYDON 0131 GRAMS: GRIMTOOL, CROYDON

The Dunbar & Cook Collet Chuck



Designed for use with "Ward" 2A, 3A or "Herbert" 2D and 4 Senior Capstans and Air operated Lathes, this oversize collet chuck enables second operation work up to four inches diameter to be accommodated but retains all the benefits of a ball chuck. Can now be supplied as an Air Chuck to suit any lathe.

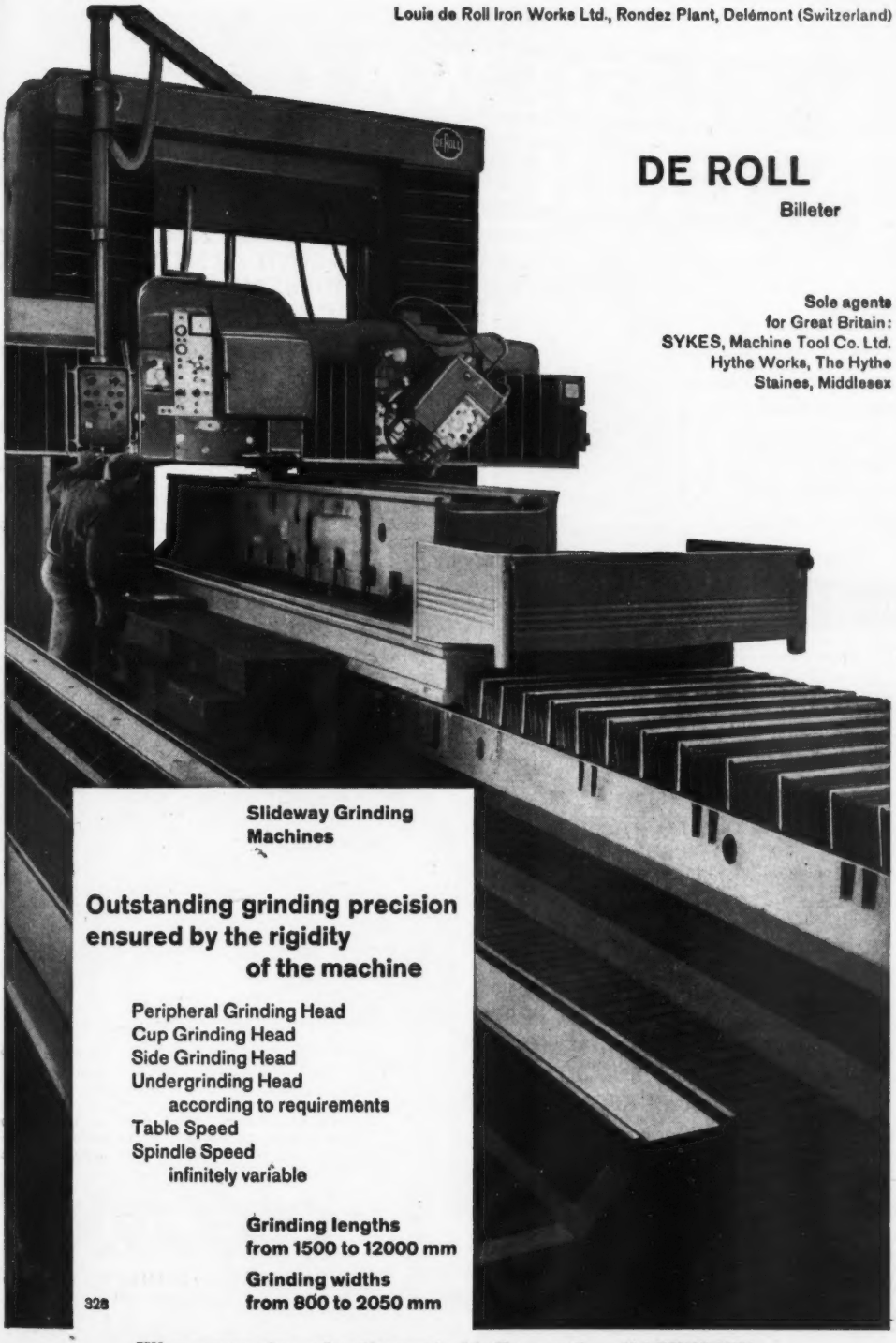
DUNBAR & COOK LTD

SPECIALISTS IN THE MANUFACTURE OF SPECIAL PURPOSE MACHINES, JIGS & FIXTURES

NEW JOHN STREET, BIRMINGHAM, 6

Phone: ASTon Cross 4101 (5 lines) Grams: "CUBAR" BIRMINGHAM

Louis de Roll Iron Works Ltd., Rondez Plant, Delémont (Switzerland)



DE ROLL

Billeter

Sole agents
for Great Britain:
SYKES, Machine Tool Co. Ltd.
Hythe Works, The Hythe
Staines, Middlesex

Slideway Grinding Machines

Outstanding grinding precision ensured by the rigidity of the machine

Peripheral Grinding Head
Cup Grinding Head
Side Grinding Head
Undergrinding Head
according to requirements
Table Speed
Spindle Speed
infinitely variable

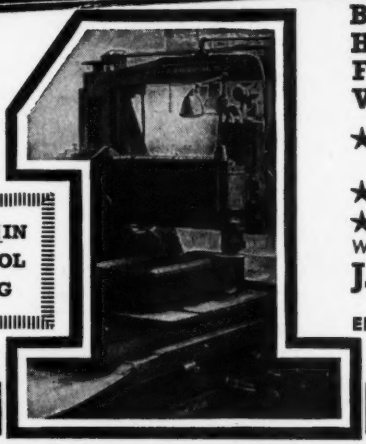
Grinding lengths from 1500 to 12000 mm

Grinding widths from 800 to 2050 mm

328

When answering advertisements kindly mention ***MACHINERY.***

SLIDEWAY GRINDING



SPECIALISTS IN MACHINE TOOL REBUILDING

BROCKHOUSE UNIT GRINDING HEAD AND TRUING DEVICE FOR HORIZONTAL AND VERTICAL GRINDING

★ **Easily adaptable on most standard machines**

★ **Rapid and accurate**

★ **Slideway Grinding Enquiries Invited**

Write for descriptive folder to:—

J. BROCKHOUSE & CO. LTD.

Machine Tool Division

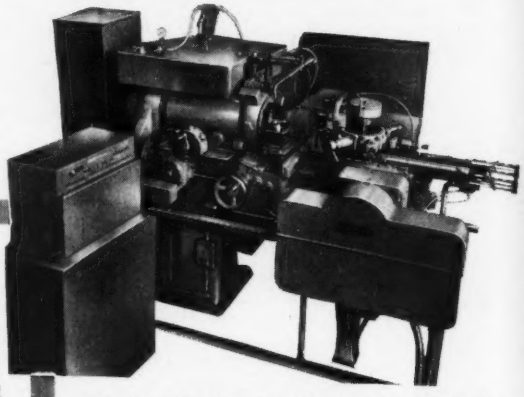
ELMS WORKS, PENN ROAD, WOLVERHAMPTON

Phone: Wolverhampton 23801

AT **SETTING**

---

* Capstan lathe to Camless auto



with NICKOLS

AUTOMATIC SEQUENCE CONTROL

* **INSTANTANEOUS CHANGEOVER FROM BAR TO SECOND OPERATION & CHUCKING WORK**

- NO CAMS
- INCREASED OUTPUT
- NO SPECIALISED TRAINING
- LOW COST & GREAT ECONOMY

The illustration shows a WARD No. 2A Capstan with NICKOLS automatic sequence control conversion. This renders the capstan completely automatic on both bar and second operation work. The conversion is completed in only 2½ days on your own shop floor, by our highly trained staff who also instruct your capstan personnel in the setting and operation of the machine. Conversions are also available for HERBERT 2D.

NICKOLS

AUTOMATICS LTD. 7 CARLISLE RD., LONDON N.W.9

Tel: Colindale 6141

AJAX RADIAL

Chosen for Leeds University

The AJAX AJ35 Radial Drill illustrated is installed in the maintenance department at Leeds University.
The complete versatility of this machine for drilling, spot-facing, boring and tapping make it a most economical machine tool for practically every industry with —

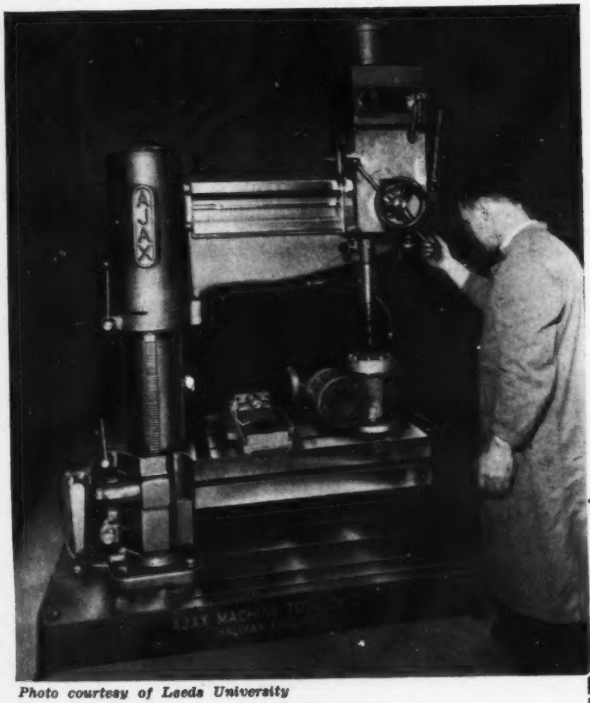


Photo courtesy of Leeds University

AJAX RELIABILITY

Brief Specification

* 1¼in. Drilling Capacity in Mild Steel; 1¾in. in Cast Iron
* 3ft. or 4ft. Arm
* Spindle No. 4 M.T.
* Nine Spindle Speeds
* Speed Range 100-1,500

POST THIS COUPON TODAY!

To Ajax Machine Tool Co., Ltd., Halifax
Please send me Brochure of Ajax Machines

NAME .....

POSITION .....

FIRM .....

ADDRESS .....

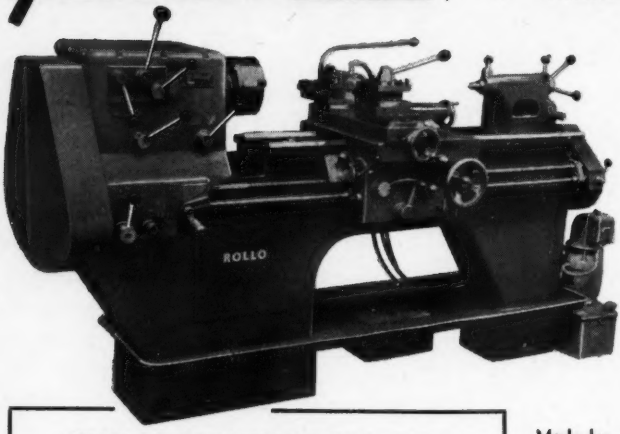
.....

AJAX MACHINE TOOL COMPANY LTD.
WEST MOUNT WORKS, HALIFAX, YORKSHIRE, ENGLAND
Telephone: 5395/9. Telegrams: Ajax, Halifax

Rollo

FACSIMILATHE

14" SWING HIGH SPEED COPYING LATHE



10 Spindle Speeds 39 - 1,000 R.P.M.
20 Speed Feed Box

AUTO FEED TO TAILSTOCK

OIL BATH APRON & FEED BOX

Available as follows :

Copying and Centre Lathe with Auto Feed to Tailstock

Copying and Centre Lathe

Centre Lathe with or without Auto Feed to Tailstock

THE 'FACSIMILATHE' CAN BE SEEN WORKING AT :
The Machine Tool Co. Ltd., London Road, Nottingham

Made by

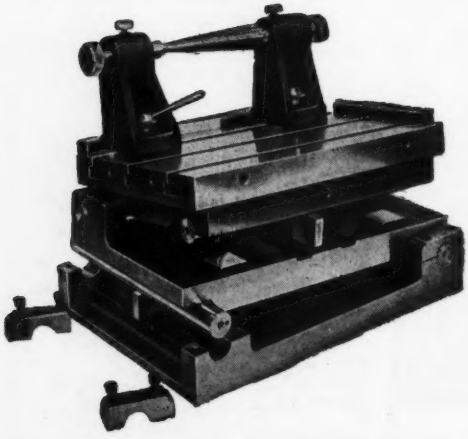
ROLLO INDUSTRIES LTD.
ST. ANDREW'S WORKS, BONNYBRIDGE, SCOTLAND

CROWN

"Composine"

COMPOUND AND SIMPLE ANGLE SINE TABLES

NEW UNIVERSAL TYPE: *MADE TO HINGE FROM EITHER END OF BASE PLATE TO ENABLE ALL COMPOUND ANGLES TO BE OBTAINED*

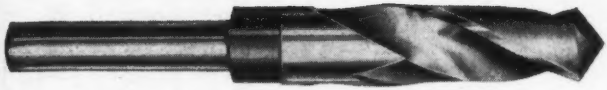


TYPE E.W.U/L. Face 11in. x 7in. £185 complete with 6in. centres.

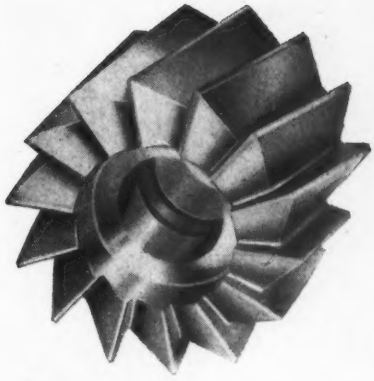
SIZES: TYPE E.W.U/L.
Face (T Slotted) ..... 11in. x 7in.
Base ..... 12in. x 8¼in.
Height at rest ..... 5in.
10in. and 5in. Roller Centres.
TYPE E.W.U/S.
Face (T Slotted) ..... 8in. x 5in.
8in. and 5in. Roller Centres.

N.P.L. Certificate supplied at cost if required
Guaranteed accuracy 0·2 minutes of arc.
Can be supplied with electric magnetic or non-electric magnetic face.

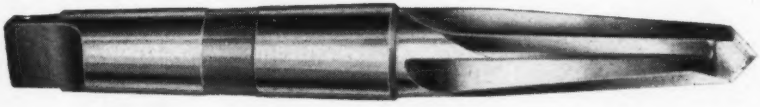
WINDLEY BROTHERS LIMITED
CROWN WORKS . CHELMSFORD . ENGLAND
TELEPHONE: CHELMSFORD 2224



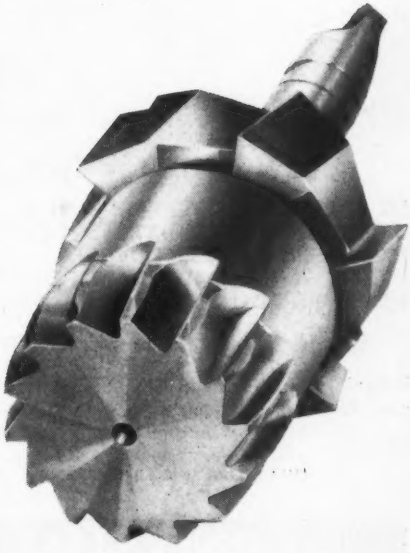
For "standards" that are special



Jobbers' drills • taper shank drills reamers • milling cutters • end mills side and face cutters • angle cutters



and "specials" that are extra special



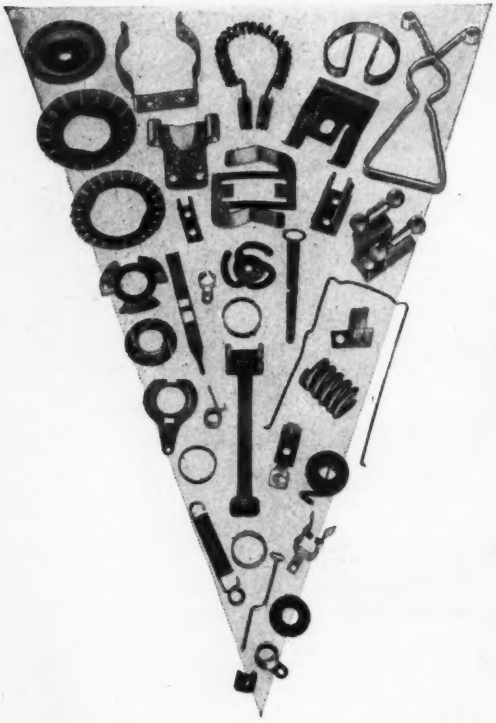
"Lubricold" oil-hole drills • multi-diameter sub-land drills • taper reamer drills • armour piercing and manganese drills • combined parallel drills and reamers • carbide tipped drills • engineers' tools of all kinds to specification

TALK TO

Stalker

Stalker Drill Works Ltd., Drill Square, Sheffield 6. Telephone: 343057

OA/5778



Presswork and Springs of every type

IN ALL METALS TO THE FINEST LIMITS
SPECIALISTS IN BERYLLIUM COPPER
PRORESSIVE PRESS TOOLS
MULTI SLIDE AND TRANSFER PRESSES
HIGH PRODUCTION DEEP DRAWING

Electro (Spark) Erosion for the Trade

Helical Tension, Torsion and Compression Springs and Wire Shapes from 40 S.W.G. (0·0048in.) to $\frac{3}{16}$in. dia. Wire

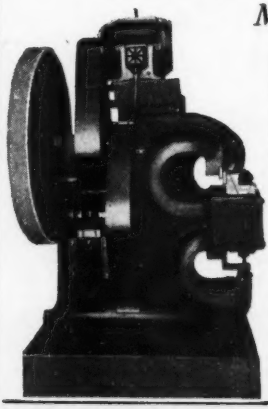
FULLY A.I.D. AND A.R.B. APPROVED

SPRING STEEL PRODUCTIONS LTD

Factories Pressings: **784-788 HIGH ROAD, TOTTENHAM LONDON, N.17 · TEL: TOTTENHAM 7745/7**
Coiled Springs: **COMMERCE TRADING ESTATE, RAVEN ROAD SOUTH WOODFORD, E.18**

S. APPLEYARD (A)
& COMPANY LIMITED
BOOTHTOWN
HALIFAX
Telephone No. 2502 Halifax

Manufacturers of



SINGLE ENDED PUNCHING AND SHEARING MACHINES
with capacities from: punching $\frac{3}{4}$in. through $\frac{1}{2}$in. and shearing $\frac{1}{2}$in. plate . . . to: punching $\frac{3}{4}$in. through $\frac{1}{2}$in. shearing $\frac{1}{2}$in. plate and angle cropping 4in. by 4in. by $\frac{1}{2}$in.

BAR SHEARING MACHINES
from $\frac{3}{4}$in. dia. up to 2in. dia mild steel.

DOUBLE ENDED MACHINES
from $\frac{3}{4}$in. dia. through $\frac{1}{2}$in. to $\frac{3}{4}$in. dia. through $\frac{1}{2}$in. angles up to 4in. by 4in. by $\frac{1}{2}$in Shearing up to $\frac{3}{4}$in. thick.

Greater security . . .
lower production costs

C.V. Hollow Tension Pins, equal in sheer strength to solid mild steel pins are the answer to many fixing problems.
Reaming becomes unnecessary—C.V. vibration absorbing Tension Pins are easily inserted into misaligned holes, and will not shake loose. Their application obviates the need for taper, dowel and split pins. Maintenance is simplified . . .
simply drift out and re-use!

There are also light duty pins especially suited for use with alloys, porcelains, plastics, etc.

Diameters range from $\frac{1}{16}$in. to 2in., and there is a large range of metric sizes available.

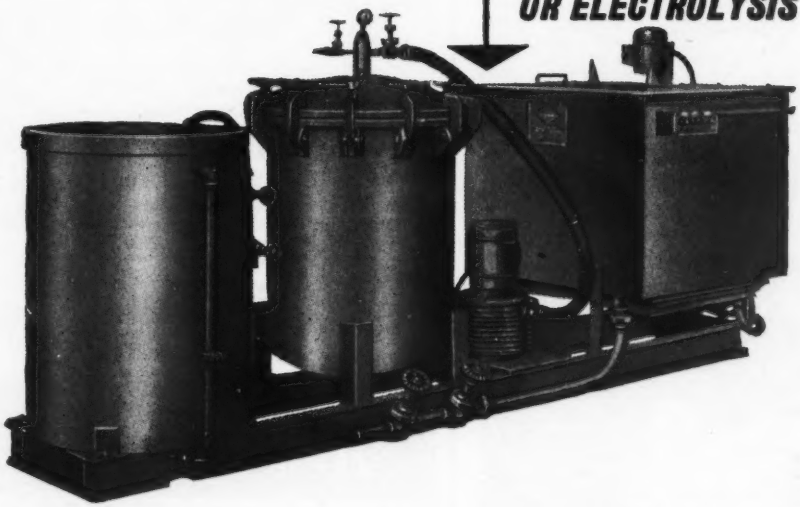
Highly Competitive Prices—
Generous Quantity Discounts.

Write now for fully descriptive catalogues to:

HEADLAND ENGINEERING DEVELOPMENTS LIMITED
PRODUCTION PRODUCTS DIVISION
45-46, Lower Marsh, London, S.E.1. Tel.: WATerloo 7752-3

new Impregnation Process for Porous Castings

THE NEW MOGUL CAST SEAL PROCESS IMPREGNATES CASTINGS *WITHOUT BAKING WITHOUT DISCOLOURATION WITHOUT RUSTING OR ELECTROLYSIS*



The MOGUL CAST-SEAL Impregnating Process utilises a metallic colloidal solution, which is pressurised round and through the castings and permanently seals leaking and porous places. The solution penetrates into the leaks and builds up a metallic seal right through the wall.

Ferrous and non-ferrous castings can be treated in 45 minutes without preparation (other than de-greasing where necessary) and do not require subsequent baking or cleaning. The process does not affect the appearance of the castings in any way.

An Impregnating service to the trade is operated at Sheffield.
Patented by the Metallizing Company of America.
Manufactured in France by the RONCERAY *Group of Companies.*

BRITISH RONCERAY LIMITED
14, WOLSELEY ROAD, SHEFFIELD, 8

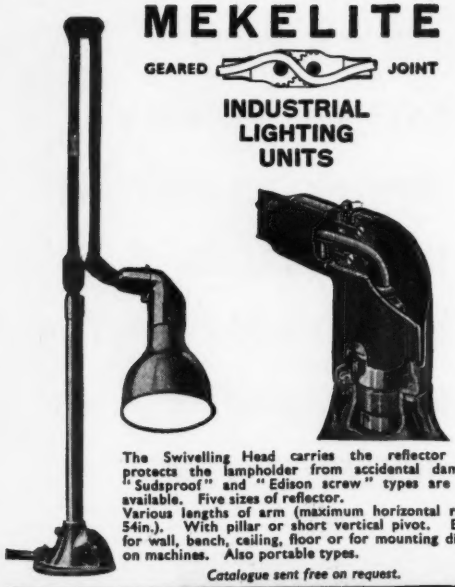
Telephone: 54108 Telegrams: Bronceray Phone Sheffield 8 OA/2346

When answering advertisements kindly mention MACHINERY. P2

MEKELITE

GEARED JOINT

INDUSTRIAL LIGHTING UNITS



The Swivelling Head carries the reflector and protects the lampholder from accidental damage. "Sudsproof" and "Edison screw" types are also available. Five sizes of reflector. Various lengths of arm (maximum horizontal reach 54in.). With pillar or short vertical pivot. Bases for wall, bench, ceiling, floor or for mounting direct on machines. Also portable types.

Catalogue sent free on request.

MEK-ELEK Engineering Ltd.
17, Western Road, Mitcham, Surrey
Telephone: MITcham 1072 Cables: Mekelek, London

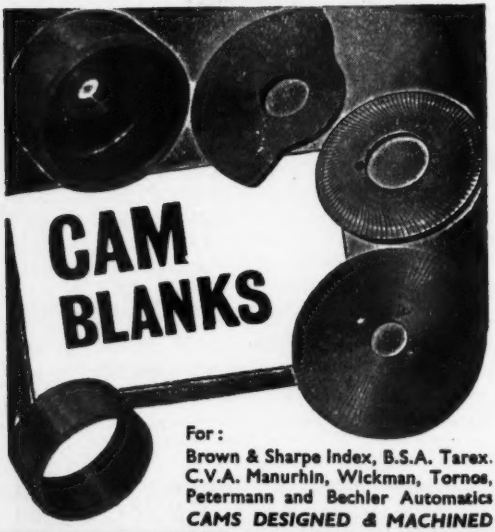
COXETER
Revolving Centres

- Models for Bar or Tubular work
- Standard sizes, morse taper and parallel shanks
- Best Cast Steel construction hardened and ground
- Heavy duty bearings
- Especially suitable for heavy cutting with tipped tools
- Special sizes quoted for
- Quick Deliveries

IMPROVED TYPES

Price list on application

REVOLVING CENTRES LTD.
40-41 PARK END STREET, OXFORD
Phone: OXFORD 42275/6 *Grams:* COXETERS, OXFORD



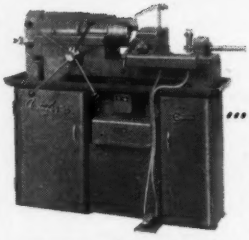
CAM BLANKS

For:
Brown & Sharpe Index, B.S.A. Tarex. C.V.A. Manurhin, Wickman, Tornos, Petermann and Bechler Automatics
CAMS DESIGNED & MACHINED

MOSER CAMS & TOOLS LTD.
465, HORNSEY ROAD, LONDON, N.19.
Tel.: ARCHWAY 1766 and 7017

CENTAMAX

NEW TIME-SAVING FROM THIS MACHINE



CAN YOU FACE IT?

... and centre it too?

Can you face these hard facts—the time you are wasting on centering and facing bar stock in preparation for your centre or copy lathe?

So here is an opportunity for NEW time-saving on a much neglected job. At under £650 basic "CENTAMAX" is a machine that YOU can afford.

Automatic speed change—FAST for centering—SLOW for facing

Sole Distributors:—
Monks & Crane Ltd.
BIRMINGHAM · LONDON · MANCHESTER · GLASGOW
NEWCASTLE-ON-TYNE · BRISTOL · LEEDS

SM/MC 6376

BLB
BRITISH LAMINATED BRASS

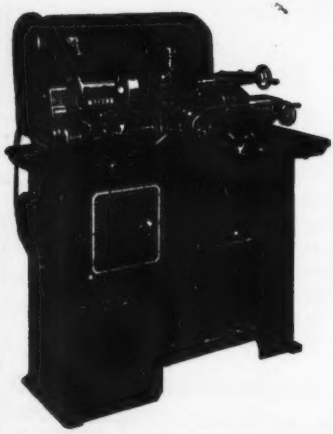
FOR SIMPLE
ACCURATE
EFFICIENT
SHIMMING

PEELS IN 2 OR 3 THOU LAMINATIONS

BRITISH
LAMINATED
BRASS CO. LTD.
SLOUGH
BUCKS

European Distributors for Sheet (excluding British Isles)
BENJAMIN WHITTAKER LIMITED
VICTORIA HOUSE, VERNON PLACE, SOUTHAMPTON ROW, LONDON W.C.1.

BUCK & RYAN LTD.
— TOOL MERCHANTS —
Established 1824
310-312 EUSTON ROAD, LONDON, N.W.1
Tel: EUS 4661 And at 261 EDGWARE RD. LONDON, W.2



MYFORD 3½ SUPER 7B LATHE ON INDUSTRIAL STAND WITH SUDS EQUIPMENT

We are Myford Specialists and have good stocks of Accessories for Immediate Delivery.
Leaflets and Quotations on Request.

QUICKER.. EASIER..
TOOL SHARPENING

David
Dowling
TOOL & CUTTER GRINDERS

BENCH MODEL (*As above*). An outstanding feature is the 180° rotation of workhead, allowing side and face cutters to be ground on periphery and both sides without removal from the centres. Vibration-free construction enables the finest possible finish to be obtained. Capacity 9in. dia. by 13in. Universal workhead and radius grinding attachment available.

FLOOR MODEL. This machine, with its unique combination of horizontal, vertical and angular movements so simplifies the grinding of form and die-sinking cutters that accurate results can be obtained quickly and easily. Capacity: 10in. dia. by 14½in.

Stocked by Buck & Hickman Ltd., Thos. P. Headland Ltd.

DAVID DOWLING LTD
BATES ROAD . HAROLD WOOD
ROMFORD . ESSEX
Telephone: Ingrebourne 43904/5

AGENTS THROUGHOUT THE WORLD

TEMPO *Automatic* **SAW SHARPENER**

Slitting Saws

Hacksaw and

Bandsaw Blades

... accuracy with automatic sharpening

Grinds Slitting Saws up to 15¼in. dia. Hacksaw blades up to 2⅜in. × 28in. and Bandsaw blades 1¼in. wide.

An accurate retoothing device is fitted.

EARLY DELIVERY

Send for Comprehensive Illustrated Brochure
Exclusive Distributors in the United Kingdom.

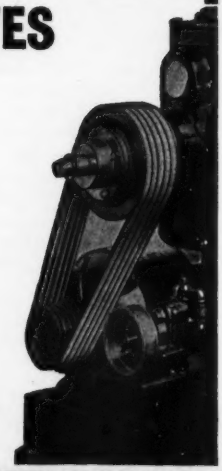
ELGAR **MACHINE TOOL COMPANY LIMITED**

172-178, VICTORIA ROAD, - ACNON - LOLDON, W.4 - Tel.- ACO 5555
Midlands Showroom: 1075, Kingsbury Road, Birmingham, 23
Tel.- Cartle Bromwich 1781/2

NRP 3352

THRAPSTON V-ROPE DRIVES

- *FLEXIBLE*
- *EFFICIENT*
- *RELIABLE*
- *ECONOMICAL*
- *SILENT*
- *CLEAN*



With maximum horsepower and long life.

Tel.: Thrapston 531/532.

SMITH & GRACE LTD
THRAPSTON · KETTERING

SAVE STRIPPING by FITTING

CROSS *THE BRITISH*
WIRE THREAD INSERTS

- HARD THREADS IN SOFT MATERIALS
- NEW THREADS IN DAMAGED COMPONENTS

FULL RANGE OF SIZES AND THREAD STANDARDS IMMEDIATELY FROM STOCK

CROSS MANUFACTURING CO. (1938) LTD.
BATH, SOMERSET. TEL: COMBE DOWN 2355-8. GRAMS: CIRCLE, BATH
Specialists in the manufacture of Jet Engine Labyrinths, Circlips, Spring Washers, Springs, etc.

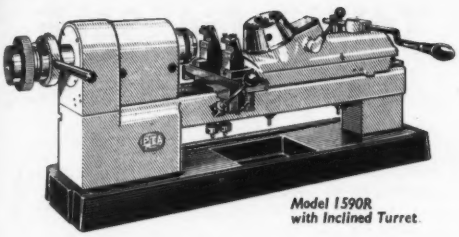
HUMPHREYS

Platen Type **DEMAGNETISERS**

This is a useful type of demagnetiser for quickly dealing with ordinary components in workshops. It is only necessary to pass the magnetised pieces over the platens and they instantly loose the magnetism

J. H. HUMPHREYS & SONS LTD.
BLACKRIDING ELECTRICAL WORKS
WERNETH OLDHAM.

TELEGRAMS: HUMPHREYS OLDHAM
TELEPHONE: OLDHAM MAIN 6067

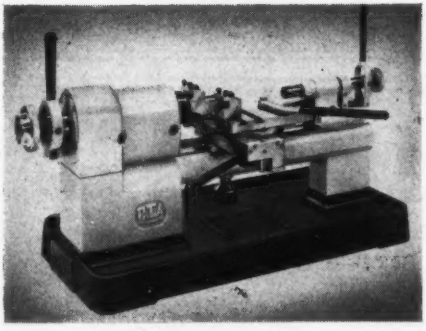


Model 1590R with Inclined Turret

accurate and fine limits on.....

PULTRA micro lathes

PRECISION BUILT BY
SMART & BROWN (MACHINE TOOLS) LIMITED



Production Lathe Model 177OP

Available in 50, 70 & 90 mm Centre Heights Toolroom, General Purpose and Production Models.

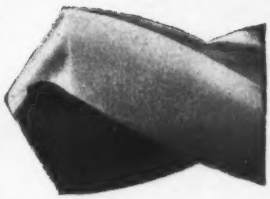
All machines can be furnished with cut-off & Capstan Slides.
Lathes can be equipped to your requirements from standard units.

PULTRA LIMITED

25 MANCHESTER SQUARE · LONDON · W.1.
Telephone: WELbeck 7941-6 Cables: Smartool, Wesdo, London
Member of the GAS PURIFICATION AND CHEMICAL GROUP OF COMPANIES

NRP 3493

Prolong drill life . . . maintain high cutting performance



You really must find a place in your tool-room or machine shop for a Hunt Drill Point Grinder. It will ensure better drill point sharpening and point thinning, longer drill life, more accurate holes and faster rates of penetration in whatever metal you handle.

Ask for details of our range which includes medium and heavy duty models.

HUNT
MACHINE TOOLS

TWIST DRILL POINT GRINDING MACHINE

HERBERT HUNT & SONS LIMITED
MACHINE TOOLS

Elsinore Road, Old Trafford, Manchester 16, England

Tel: Trafford Park 0663
Grams: Hunting Manchester 16

Grinding and Polishing consult RJH

'GIRAFFE' UPRIGHT BACKSTAND MACHINE

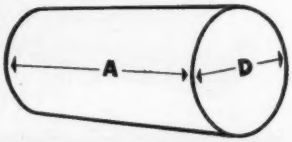
Occupies a minimum of floor space. Suitable for rough grinding or polishing. PRICES FROM **£275**

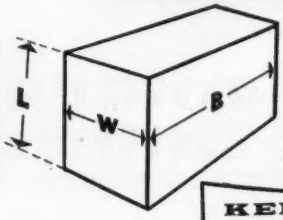
R. J. H. TOOL & EQUIPMENT CO. LTD.
HECKMONDWIKE, YORKS.
Tel: Heckmondwike 490

TANKS for SALE

STORAGE OIL FUEL - ETC
CHEAP WHILE STOCKS LAST
¼" M.S. PLATE

Capacity 4,000 galls
Size 'A' 14' 0"
'D' 7' 8" dia
Price £195.0.0. each





Capacity 1,300 galls
Size 'B' 10' 6"
'L' 6' 0"
'W' 3' 6"
Price £85.0.0. each

KEMPSAFE

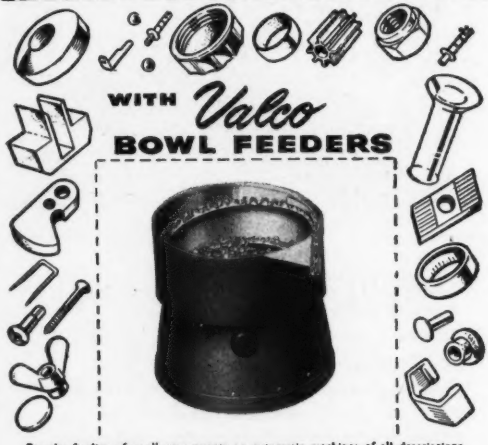
(Dept. M.) KEMPSAFE OIL BURNERS LTD
Quayside Road
SOUTHAMPTON - 27655

Get more **USEFUL SPACE**
with planning models

Handbook: 'THREE-DIMENSIONAL FACTORY LAYOUT'
From: VISUAL PLANNING SYSTEMS LTD
ATHLON RD · ALPERTON · MIDDX · Perivale 9935 6

AIDS TO AUTOMATION

WITH *Valco* **BOWL FEEDERS**



For the feeding of small components to automatic machines of all descriptions. Components are fed out in single file in correct alignment to be received by the machine. Rate of feed variable, easily set to suit the particular job.

Feed tracks can be designed to handle awkwardly shaped components in the manner required.

Bowl Feeders available in a range of sizes from 6" to 36" diameter.

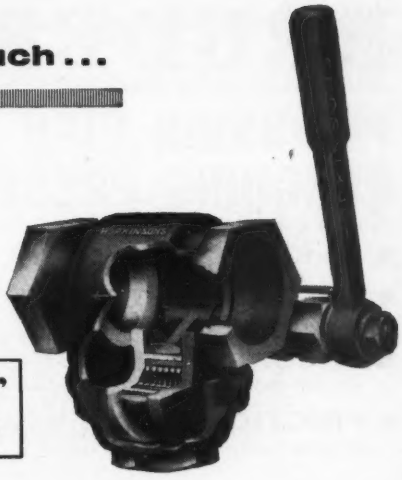
Send for leaflet No. 160.

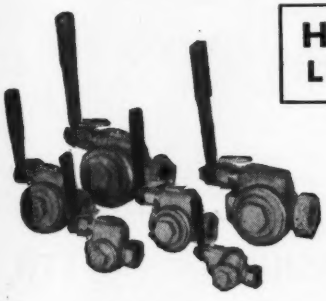
MANUFACTURERS OF VIBRATORY FEEDING AND ELEVATING EQUIPMENT FOR POWDERS, GRANULES, ETC.

VALLEY PRODUCTS (LYE) LTD
MANUFACTURERS OF VALCO AUTOMATIC WEIGHING AND FILLING MACHINERY
VALLEY ROAD · LYE · STOURBRIDGE

The valve that does too much...

Not from the users' point of view—they thank their lucky stars for HOPKINSONS' bronze Link Valves—but how can we hope to tell you about a valve that handles water, full of sand and grit, thick heavy liquids such as molasses, resin size or oils, soap lines, compressed-air lines in mines and quarries, process steam in textile and food factories, dye works, laundries, sugar refineries etc., and moreover is 'tough', easy to operate, reliable and has a long life—all in one advertisement? Write for leaflet 5704.





HOPKINSONS' LINK VALVES

One of HOPKINSONS' Small Bronze Valves

HOPKINSONS LIMITED · HUDDERSFIELD

LONDON OFFICE: 34 NORFOLK STREET · STRAND · W.C.2

HV104

Electrically Operated

COUNTER

AT NEW LOW COST

- Rated speed-up to 1000 Counts per minute.
- Designed for panel or base mounting.
- Centre reset by knob.
- Connection by flying leads.
- Maximum voltage 110 D.C.—250 A.C.

MODEL 442

English Numbering Machines Limited

Dept. 9A. · Queensway · Enfield · Middlesex

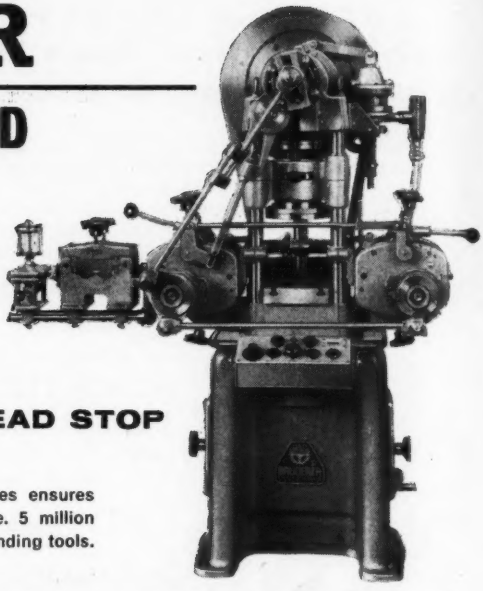
Tel: HOWard 2611 (5 lines) Grams: Numgravco, Enfield

Full technical information on request

LEADING MANUFACTURERS OF COUNTING AND NUMBERING DEVICES

BRUDERER

PRECISION HIGH SPEED PUNCHING PRESSES



- **6–12–18 TON CAPACITIES**
- **SPEEDS UP TO 1400 SPM**
  according to stroke and feed
- **PRECISION ROLL FEED**
  with micrometric accuracy
- **FRICTION CLUTCH WITH DEAD STOP**
  as optional extra

The three pillar Design of the Bruderer Swiss built Presses ensures greater accuracy resulting in considerably longer tool life. 5 million components are knownto have been produced between regrinding tools.

Exclusive Distributors in the United Kingdom

SMM **SHEET METAL MACHINERY CO. LTD.**

POYLE ROAD · COLNBROOK · SLOUGH · BUCKS · *COLNBROOK 2442/3/4*

H.P.8466

"TURNCO"

REGD TRADE MARK

GEAR SERVICE

FOUNDED 1919

REPLACEMENTS FOR INDUSTRY

CUSTOMERS BLANKS CUT

G. H. TURNER & CO. LTD.

Bell Street, Wolverhampton 'Phone 20852/3/4

'MURENCO'

Regd.

MURENCO ROLLERS AND PINS

To Suit the Following Box Tools

WARD.PATTERN—No. OE, 2A, 3A, 7, 7 COMB.
BROWN & SHARPE—No. 00EA, 20EA, 22EA.
HERBERT—No. 00, 0, 1 CAP, 1.2D & 2S CAP, 4, 4B & 4 SEN.
INDEX—No. 1, 2, 3.
TAYLOR—No. 1, 2, 3.

ALL SIZES EX STOCK

THESE ROLLERS ARE GUARANTEED TO BE CONCENTRIC AND OF THE FINEST PRECISION.

LEAFLETS ON APPLICATION, INDICATING DIAMETER, WIDTH BORE, ETC.

Manufactured by:

MURRAY'S PRETORIA ENGINEERING CO. LTD.

16-2 PRETORIA ROAD, ROMFORD, ESSEX ROMFORD 42380.

BIG or small awkward or simple

...If it's a job for precision surface hardening with little dimensional change, then it's a job for the special skills and special equipment of Flame Hardeners. Whether you deal in quantities or have an individual hardening problem, call in Flame Hardeners from the start. Their experience and knowledge can save you a lot of trouble —not to mention cost!

CASTINGS, GEARS, TYRE ROLLS, CRANE WHEELS, BALL RACE RINGS, WIRE ROPE SHEAVES, AXLE PINS, CHAIN PINS AND LINKS, SHEAR BLADES, ROLL NECK RINGS, MACHINE TOOL BEDS, in fact anything and everything that requires precision surface hardening. Send for literature.

Flame Hardeners LTD

Everywhere in the British Isles served from:
SHORTER WORKS, BAILEY LANE, SHEFFIELD, 1, Telephone: Sheffield 21627

DRILLMAX

ADJUSTABLE CENTRE MULTI-DRILL HEADS

"V" SERIES UNIVERSALLY ADJUSTABLE CENTRE MULTI-DRILL HEADS

Made in four sizes to suit either medium or heavy drilling requirements—quick adjustment—positive locking.

- ★ Hard Light Alloy Body
- ★ Hardened and Ground Gear Drive
- ★ Ball Type Universal Joints
- ★ Anti-Friction Bearings
- ★ Bush Lugs provided for Guide Rods
- ★ Spindles run at the same speed and direction as the drilling machine spindle.

High quality product designed and made for continuous productive service.

"M" SERIES ADJUSTABLE MULTI-HEADS

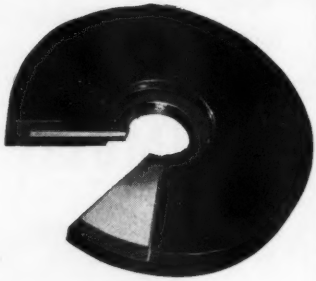
Made in 12 Models to cover wide range of application.

ROBUST - COMPACT - TOTALLY ENCLOSED

- ★ Rapid positive adjustment: simply slacken Central Locking Screw, turn spindle to desired position and re-lock.
- ★ Minimum of rotating parts.
- ★ Positive Drive by Heat Treated Gears.
- ★ Quick vertical adjustment to Spindles.
- ★ Light Alloy Bodies with Lugs for Guide Bars.
- ★ Designed for either Self-oiling or Roller Bearings, dependent upon Model Size.
- ★ Silent operation.

BRASSHOUSE *Drillmax*

Drillmax Division, Leighswood Works, Leighswood Road, Aldridge, Staffs,
Telephone: Aldridge 52439.



RUBBER TO METAL BONDING

also Precision Rubber Mouldings in Natural and all types of Oil, Heat and Chemical Resistant Synthetic Rubbers including Silicone Rubbers, "Hypalon,"* and "Viton,"* Du Pont's new Fluorinated Elastomer for supremely high temperature duty.

SUSSEX RUBBER CO. LIMITED
School Road, London, N.W.10

SUSSEX INDUSTRIAL DIVISION SERVICE TO INDUSTRY

SUSSEX

*Regd. Trade Marks—Du Pont.

MACHINERY'S ANNUAL BUYERS' GUIDE 32nd EDITION PRICE 12/6

TAKING BUILT-IN STEPS TO SAFETY!

ROCKWELL HELICAL CLAMPS

BRITISH PATENT

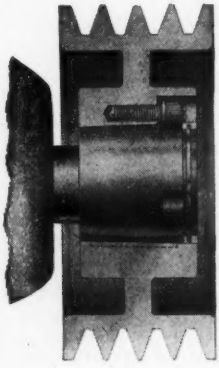
A range of popular sizes to suit any T slot or clamping height · No loose parts to lose · Each size adjustable for height · Any quantity Ex-Stock.

Write or phone Dept. D/C for leaflet giving prices and full technical details

ROCKWELL MACHINE TOOL CO. LTD. WELSH HARP, EDGWARE ROAD LONDON, NW2 · GLAdstone 0033

Also at: Birmingham — Telephone Springfield 1134/5 - Stockport — Telephone Stockport 5241 - Glasgow — Telephone Merrylee 2822 S.C.6

WIGGLESWORTH



Makers of TEXROPE V-DRIVES with Magic-Grip BUSHES

GROMMET CONSTRUCTION "TEXROPE" BELTS

FRANK WIGGLESWORTH & Co. Ltd.
ENGINEERS SHIPLEY
YORKSHIRE Phone : SHIPLEY 53141

"Duplex" Direct Drive

TOOL POST GRINDERS

Here are two additions to the range of Duplex Tool Post Grinders. They are, in effect, precision grinding spindles with carefully balanced 3 phase rotors mounted thereon. Super precision bearings are used throughout. These units can be used in any position from the horizontal to the vertical for plain, form and cup grinding on lathes, shapers, planers and other machine tools. They are the answer to many an awkward production problem.

Two sizes are made,

D.50	7in. by ¾in.	0.5 H.P.
D.60	14in. by 1¼in.	3 H.P.

3 phase only, any voltage.

Send to-day for our complete Catalogue of Tool Post Grinders.

DUPLEX ELECTRIC TOOLS LTD.,
WOBURN WORKS, PURLEY, SURREY
Telephones: **UPLands 3731-8621.**

NAME PLATES AND ENGRAVING

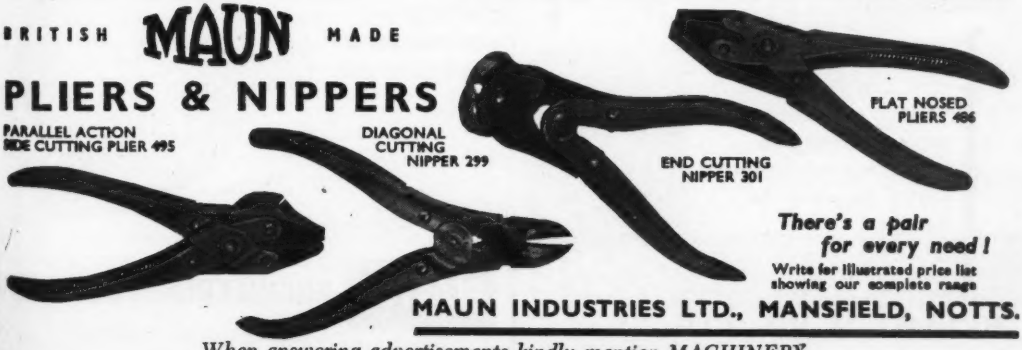
FOR INDUSTRY
ALSO LIGHT METAL
PRESSINGS AND STAMPINGS

Are you satisfied with the Design · Quality · Price of your nameplates? Check with us, we specialise in nameplates of every description.

FRANK BAKER & SONS LTD.
27, 28 and 29 ST. PAULS SQUARE, BIRMINGHAM 3. Telephone CENtral 7411 (2 lines) Telegrams "NAMING" Birmingham

BRITISH **MAUN** MADE

PLIERS & NIPPERS



There's a pair for every need!
Write for illustrated price list showing our complete range

MAUN INDUSTRIES LTD., MANSFIELD, NOTTS.

You can cut SPUR AND BEVEL GEARS on your shaping machine with

Bevel gear attachment 6" and 12" sizes.

MATTERSON
GEAR CUTTING ATTACHMENTS

With these two simple attachments — one for spurs and the other for bevels — you can cut gears up to 12 in. dia., 4 D.P., of correct involute form, any pressure angle, with a simple V-type tool. Easily fitted to any make of shaping machine. The spur attachment can be used as an efficient dividing head on your miller.

Spur gear attachment 12" dia.

Write now for fully illustrated catalogue M/228 to Sole World Distributors:

EARLY DELIVERY

DOWDING & DOLL LTD
346 KENSINGTON HIGH STREET, LONDON, W.14
Tel: WESTERN 6077 (8 lines) Telex: 23182 Grams: ACCURATOOL LONDON TELEX

228

TAPER PIN REAMERS

PROMPT DELIVERY OF ALL SIZES

TEL: STAFFORD 304

J. H. LINES LTD. 46 Stone Road, Stafford

STRANDS
DRILLING MACHINES

offer SPEED plus RIGIDITY plus ECONOMY!

MEC

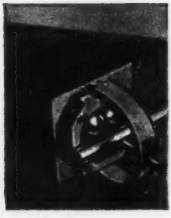
Built by specialists in drilling machines, these economical models offer all you need for reliable drill work — at the right price.

There is a wide range of Bench and Floor Models—ask us for full data.

MORTIMER ENGINEERING Co. Ltd.

Mortimer House, Acton Lane, London, N.W.10
Telephone: ELGar 3834 NRP 5161

Why use V-Blocks



When you can now buy

'B' (BALL) BLOCKS

ACCURATE TO ± 0·0002 in.

COMPETITIVE IN PRICE

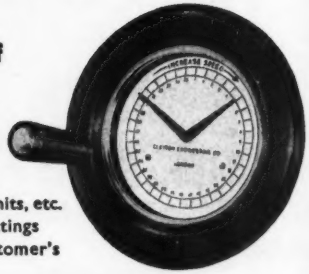
Will accommodate a wide range of diameters. Provide two different angles of contact on the same block so that lobing can always be detected.

RUBERT & CO. LTD.

DEMMINGS ROAD, CHEADLE, CHESHIRE *Tels: GATley 5855, 6058*

CLAYTON indicators

wherever indication of rotary movement is required



For machine settings, power transmission units, etc. Dials, ratios and Mountings can be supplied to customer's requirements.
Illustrated Booklet on request.

CLAYTON ENGINEERING COMPANY

R. C. HAMMOND (CLAYTON) LTD.
ORCHARD STREET, CRAWLEY, SUSSEX
TELEPHONE: CRAWLEY 26238

"Pretty good adhesion for a structural plastic!"

Double Bond is an Epoxy based, self-setting structural plastic with exceptionally powerful adhesion to practically any material and unique control of flexibility. Because there are no volatiles, there is negligible shrinkage and it is highly chemically resistant. Double Bond can be used for permanent bonding, filling, moulding and for the fabrication of actual parts. There are two grades — putty or cream. Both set like lead, machine like brass and can be used as a cold solder.

DOUBLE HERMETAL BOND

STRUCTURAL PLASTIC

Double Bond, one of the Hermetite range of jointing and filling compounds, is made by The Kenilworth Manufacturing Company Limited, pioneers and specialists in this field.

For technical advice and trial pack (7/6) contact Kenilworth.

The Kenilworth Mfg. Co. Ltd., Hermetite Works, West Drayton, Middx. Tel: West Drayton 3731

WIDEST RANGE
of standard bolts nuts, screws in Great Britain
- including
STAINLESS STEEL

- Bright ● Black
- Brass ● High Tensile

All standard sizes normally **EX-STOCK**

BRIDGES

Write now for price list.

G. F. BRIDGES LTD.,
BORDESLEY GREEN, BIRMINGHAM, 9
(Victoria 5511, 10 lines)
Also at Hill Top, West Bromwich
(Wednesbury 0453)

PERFECT PRESSINGS RESULT WHEN USING

The universal drawing device for any size and make of press

WORSON DIE CUSHIONS LTD.
RABONE LANE WORKS · SMETHWICK · STAFFS.

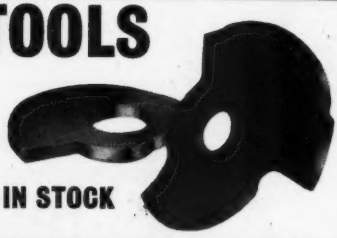
HEDGES REINFORCED PLASTICS LTD.

GLASS FIBRE REINFORCED PLASTIC MOULDINGS
MACHINE COVERS — SAFETY GUARDS
HOPPERS — CONTROL CABINETS
DUCTING — DOORS — OIL TANKS, ETC.

DALSTON GARDENS, STANMORE, MIDDX. WORDSWORTH 6848

CAMS AND TOOLS

For
Single Spindle
Automatic Lathes

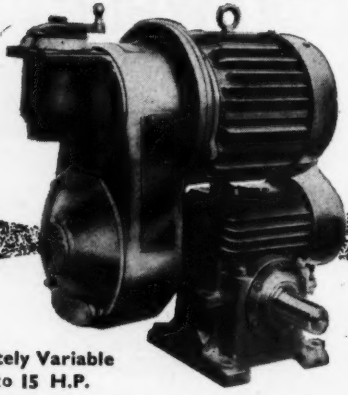


CAM BLANKS ALWAYS IN STOCK

HAESLER SALES
4 GRANGE STREET, ST. ALBANS, HERTS.
Telephone: ST. ALBANS 54336-7

Machinery's Small ads bring big results!

RAYNER POWER DRIVES



Infinitely Variable
¼ to 15 H.P.

COMPACT PURPOSE-MADE
POWER DRIVES ARE OUR BUSINESS

PETER RAYNER LTD
121 WHITEHALL RD LEEDS 12 TELEPHONE : LEEDS 33864/5

STEEL FABRICATION SPECIALISTS

C.F.IDE ENGINEERING LTD.

- GUILLOTINING
- PROFILING
- ROLLING
- BENDING
- WELDING

MACHINING—90in. DIA.

EMPIRE WORKS, 163, CLARENCE STREET,
KINGSTON-ON-THAMES Tel: Kingston 6820/6272

MAKING OR CUTTING

GEARS

SPUR · BEVEL · WORM · SPIRAL
SPROCKETS · RACKS

RODGERS BROS. LTD.
LONDON GEAR WORKS
BLACKWELL ST., BRIXTON RD., S.W.9
'PHONE: RELIANCE 2851

CLASSIFIED ADVERTISEMENTS

RATES: LINE (All type, except Situations Wanted) Col. width 1⅞ in., 13 lines per inch, min. 4 lines, 1 line averages 6 words, 2/6 per line single insertion (series discounts on request). "SITUATIONS WANTED," 1/11 per line, min. 4 lines.
DISPLAY (with or without blocks) £2 6s. 0d. per inch single column and pro rata (series rates on request).
BOX Nos. 2/- extra. Classified advertisements can be accepted at London Office up to Wednesday preceding following Wednesday's issue.

CONTRACT WORK

••• DESIGNS •••

NOW!! SPARK EROSION TO THE TRADE
On Precision Swiss Eleroda Machine
Reduce Press Tool costs
CARBIDE–FORGING–EXTRUSION
IMPACT EXTRUSION DIES
We also modify existing tools

PRESS TOOLS
LAMINATIONS—COMBINATION—PROGRESSION, ETC.
JIGS–FIXTURES
PROTOTYPE MACHINING
Designing—Short Order Work—Sub Assemblies Completely Tooled
JIG BORING AND PRECISION GRINDING
LANDEN (ENGINEERS) LTD.
1a, Aubert Park, Highbury, London, N.5
Phone: CANonbury 1075

RODGER, SETTERINGTON & PTNS.
Design Consultants
RESEARCH, DEVELOPMENT & DESIGN
SPECIAL PURPOSE MACHINERY
PRODUCTION & PLANT EQUIPMENT
Procurement Facilities:
Prototype Machines, etc.
HANGER HOUSE, WESTERN AVENUE,
TEL: PERivale 7877 EALING, W.5.

Design Capacity Available
We have a fully qualified staff thoroughly experienced in all fields of design.
ELECTRO WELDING - SPECIAL PURPOSE MOTOR TOOLING - JIG & TOOL
RELIANT DESIGN CO. LTD.
12a, Claremont Road, Surbiton, Surrey
Telephone: Elmbridge 3999

Developments — Research —
Precision Engineering capacity available.—G. B. WHALES, LTD., Rear of 123, Old Dover Road, London, S.E.3. Tel.: Greenwich 6625.

PRECISION PRODUCTS (ROMFORD) LTD.
TOOL DESIGNERS AND MANUFACTURERS
For all your needs
IN
JIGS · FIXTURES · GAUGES
PRESS TOOLS · FORM TOOLS
AND SPECIAL MACHINES
A.I.D. Approved
Viking Works, London Rd., Romford, Essex. Tel: Romford 61991/2

•• ELECTRONIC EQUIPMENT ••

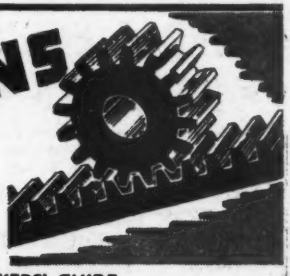
Industrial Electronic Equipment, for process control, etc., designed and manufactured to small factory requirements.—NU-GUN TELETUBES, LTD., 3, The Mews, Duckett Road, Harringay, London, N.4. 'Phone: MOUntview 2003.

•• ENGRAVING ••

Machine Engraving Company has capacity for work in all types of engraving. Also willing to undertake engraving on customers' own parts. Very prompt delivery. Also running emergency service.—METALOID ENGRAVING CO., 69, Knights Hill, S.E.27. 'Phone: Gipsy Hill 2464.

••• GEARS •••

GEARS—PRECISION AND INSTRUMENT MACHINE CUT
Max. capacity 12 D.P 8in. dia.
Blanks turned and cut.
SETON CREAGHE ENGINEERING LTD.,
TRADING ESTATE, PARK ROYAL ROAD, N.W10
A.I.D. 'Phone ELGar 3356/7 A.R.B.

RACKS & PINIONS

CUT FROM 4 D.P. TO 50 D.P.
EAGLE MILLING Co. Ltd.
114-116, Lancefield Street, LONDON, W.10
Telephone: LADbroke 0725 and 1294

Harvey-Hood

Prototype and production quantities of precision mechanical and electrical engineering to customers' design and requirements

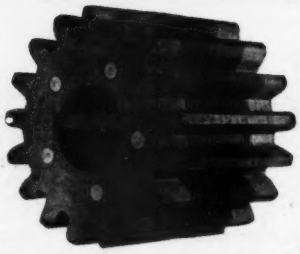
SEND US YOUR ENQUIRIES

HARVEY-HOOD ENGINEERING CO · LTD
CONTRACTORS TO THE ADMIRALTY
63a KINGSTON ROAD · WIMBLEDON · LONDON · S.W.19
TELEPHONE: LIBERTY 4235-6

Have you a Gear problem?

Our patented **Geolite** Silent gears have, by achieving a 33⅓% strength increase over all other types, apened a wide range of new applications for non-metallic gears.

Maybe we can help you!



Write for particulars:
MacECHERN & COMPANY LIMITED
HIGH STREET, CHISLEHURST, KENT Telephone: IMPerial 1103

A.I.D. and A.R.B. Approved
IDEAL
HARDENING CO., LTD.
DAVIS ROAD, CHESSINGTON, SURREY
HEAT TREATMENT SPECIALISTS HARDENING OF EVERY DESCRIPTION AND SANDBLASTING
Tel.: ELMBRIDGE 6556

GENERAL ENG'G. •• SERVICES ••

Luton Engineering Pattern Co. are prepared to undertake the manufacture of all classes of wood and metal patterns, and accuracy and prompt delivery guaranteed.—Send your enquiries to 89A Princes Street, Luton. 'Phone: 961.

Plough Grinding—Plate and Components—Ground Blanks supplied.—BRUNSWICK ENG. Co., 120, Ewell Road, Surbiton, Surrey. ELMbridge 5872.

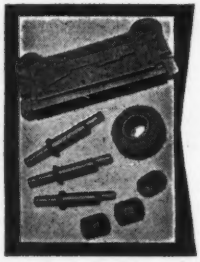
ABBEY **HEAT TREATMENTS** LTD.
PLAZA WORKS, HIGH STREET, MERTON, S.W.19
FOR ALL TYPES OF HEAT TREATMENT
A.I.D. WE COLLECT-WE DELIVER D.I.
A.R.E. TELEPHONE: CHErrywood 2291 Arm.

INDUCTION HARDENING AND BRAZING
CYANIDE HARDENING, PACK CARBURISING
Shot-blasting
PRECISION HEATING LTD.
Island Farm Avenue, West Molesey, Surrey
Phone: MOLesey 4231

Plough Grinding

ANY QUANTITY · MAXIMUM SIZES 60" x 18" RECIPROCATING TABLE
48" DIAMETER ROUND TABLE · HIGH SPEED SERVICE TOOL COMPANY LIMITED
MAPLE ROAD SURBITON SURREY TELEPHONE ELMBRIDGE 1135-6-7

24 HOUR SERVICE



GENERAL HEAT TREATMENT

CASE HARDENING AND CYANIDE HARDENING ON PRODUCTION BASIS OR SINGLY
SHOT-BLASTING A.I.D. APPROVED

CROYDON TOOL AND CASE HARDENING SPECIALISTS LIMITED
UNION ROAD · WEST CROYDON
Tel: THORNTON HEATH 5222

CASTINGS

ECLIPSE FOUNDRY

& ENGINEERING CO. (DUDLEY) LTD
SEDGLEY ROAD WEST
TIPTON ● STAFFS.
GREY IRON ALUMINIUM NON-FERROUS MAZAK

Jobbing Casting up to one ton · *Sand & Die Castings* · *Gunmetals Phosphor-Bronze* · *Pressure Castings*

Repetition Machine Moulded Work

GAUGES (*Not Thread*)—JIGS—FIXTURES, etc,
EXPERIMENTAL & PROTOTYPE WORK, A.I.D. Apd.
NOVOGAGE LTD.
(For quality and precision)
JIG-BORING, JIG-GRINDING, TOOL ROOM MACHINING
81, Bridge Road, (Nr. HAMPTON COURT STN.) East Molesey, Surrey.
Tel.: MOLESEY 2763 and 4102

PROTOTYPE & PRODUCTION
ELECTRONIC WIRING, COIL WINDING, INSTRUMENTATION & TESTING
SETON CREAGHE ENGINEERING LTD.,
G. W. Trading Estate, Park Royal Road, N.W.10.
A.I.D. ELGAR 3356/7 A.R.B.

HIGH FREQUENCY

HEAT TREATMENT CO.
INDUCTION HARDENING, BRAZING & SOLDERING
926, NORTH CIRCULAR RD., LONDON, N.W.2 Tel.: GLAdstone 2542

PROTOTYPES & SPECIAL PURPOSE MACHINES
REPAIRS AND SALVAGE BY DEPOSITION
MACHINING, FORGING & FABRICATING
GEORGE MILLS (ENGINEERS) LTD.
Beckenham, Kent. Tel.: Sydenham 5258

PLOUGH GRINDING 60 x 18 x 12
LARGE TURNING 60in. Dia.
HORIZONTAL BORING
ALAN KEIR LTD.,
NORTH ACTON ROAD, LONDON, N.W.10. ELG 2612

PRESSINGS AND LIGHT MECHANICAL ASSEMBLIES
PRESSINGS UP TO 60 TONS
LIGHT MACHINING
HEAT TREATMENT
VAPOUR BLASTING
COLD ROLLING
COINING
SWAGING
SPOT WELDING
PRESS TOOL MANUFACTURE
A.I.D. Approved
JOHN JARDINE LTD.
DEERING STREET, NOTTINGHAM

A.I.D. —THE— ELGar 5057/8
HEAT TREATMENT
PEOPLE OF LONDON
G.R.M. Heat Treatments Ltd., Coronation Rd., Park Royal, N.W.10

CASTINGS
Repetition Grey Iron and Heat Resisting. Alloy Chrome Iron Steel Castings. Heat Resisting Iron Crucibles all sizes and capacities. Metal Melting Furnaces all metals.
LEES HALL & SONS LTD.,
Newhaven Sx.
Tel. Newhaven 414

Stonebridge **PLOUGHGRINDING** Service 707 Tudor Estate, Abbey Road, Park Royal, London, N.W.10. ELG. 5353. GROUND BLANKS SUPPLIED.

Immediate Capacity Available castings, non-ferrous, dia. shell moulded sand, etc. Also machining and stove enamelling.—MILLS ENGINEERING PRODUCTS LTD., Barnet. 'Phone: Barnet 6744.

Grinding Capacity Available immediately, 72in. centres, 5in. dia. swing.—F. W. BAGGETT & CO., LTD., 8, Temple Street, Wolverhampton. 'Phone: 25794.

••MACHINING••

AUTO TURNED PARTS
FINE TOLERANCES, MAX. DIA. 1¼in.
INDEX SS & GRIDLEY MULTI AUTOS
THREAD CHASING MANUFACT'RS
ROLLER BOX TOOL HOLDERS
BENTON ENGINEERING CO., LTD.
Tonbridge Road, Harold Hill, Essex
Ingrebourne 43864/5.

Immediate Capacity Available on single spindle Automatics up to 1in. dia.—M & C AUTOMATICS, Wood Street, Guildford, Surrey. Telephone: Normandy 3240.

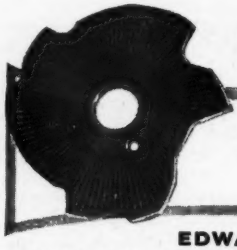
Immediate Capacity Available on Single Spindle Automatics up to 1¼in.—HARRADINE AUTOMATICS, Forge Works, Pleasant Place, Hersham, Surrey. 'Phone W.-on-T. 24914.

Thread Milling for the Trade up to 6in. O.D. and 5in. I.D. Any thread, any quantity. Keen prices for long runs. Satisfaction guaranteed.
UNICORN PRODUCTS, LTD., 119-121, Stanstead Road, Forest Hill, London, S.E.23. Telephone: Forest Hill 7688 (3 lines).

All Kinds of Firms Send All Sorts of Machines to TIMS ENG. CO., LTD., Horizontal Boring, Centre Lathe, Capstan and Combination Turret Turning. Vertical and Horizontal Milling. Grinding. Jigs, Tools, Fixtures. Moulds. Welding. Fabrications. Special machines. 1 off to batch production.—50, Bird Road, Latimer Road, W.10. LAD 7711.

Automatic Work up to 1¼in. Immediate capacity available.
TRUE ENGINEERS, LTD., Wharf Lane, Bourne End, Bucks. 'Phone 1316

LEYTON
ENG CO LTD
EST: 1929
BEECHCROFT ROAD
Tel: WAN 5540 & 3343
Telegrams: LEQUIP LONDON E18
Cables LEQUIP LONDON
Aircraft and engine servicing tools
Machine tooling equipment
Precision work
Machine parts
Turning, milling, hardening, grinding
Complete machine-unit assemblies
SOUTH WOODFORD LONDON E.18



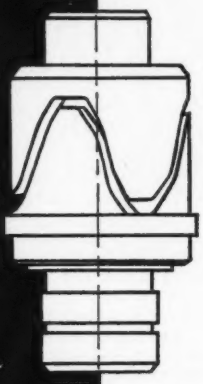
CAMS
FOR ALL SINGLE SPINDLE AUTOS
APPROX. **48** HOURS DELIVERY
EDWARDS BROS.
51 GEORGE LANE, SOUTH WOODFORD, E.18 TEL: WANSTEAD 1939

ASHTEAD
FOR
THREAD MILLING
AND
CENTRELESS GRINDING
ENGINEERING CO. LTD.
GROVE RD., ASHTEAD, SURREY
PHONE: ASHTEAD 802
ESTABLISHED 1920
A.I.D. & A.R.B. APPROVED

AUTOMATIC CAPACITY AVAILABLE
1¾in. and 2¼in. Multi-spindle
WICKMANS
HUGHES ENGINEERING CO. (LEICESTER) LTD.
Noble Works, Briton St., Leicester
Telephone No. Leicester 58196/7

THE AVENUE ENGINEERING CO
GENERAL ENGINEERING CAPACITY
7, Warner Yard, Warner Street, Mount Pleasant, Clerkenwell, E.C.1
Telephone: TERminus 2209

FOR
THREAD MILLING
CONSULT
BROWN'S ENGINEERING WORKS
Dudden Hill Lane, N.W.10.
'phone: Dollis Hill 7941



CAM cutting

Ground Plate Cams for Cam Contour Boring Machines
Barrel Cams, milled and ground—Index Cams
Conjugates—Experimental Camshafts—Gangmasters
Ground Pump Cams—Rings and Piston Cams

zephyr cams *ltd.*

Lowestoft 1784
Freemantle Road - Lowestoft - Suffolk

MACHINING

W. G. MARSDEN ENG. LTD
CAPSTANS TURRET LATHES AUTOS
LATHES MILLS DRILLS GRINDERS
COMPONENTS & ASSEMBLY PRODUCTION
FULL MACHINE SHOP SERVICE
JIGS TOOLS GAUGES PRESS TOOLS
30 FIFE ROAD - KINGSTON - ON - THAMES
KINGSTON 6112

CAPACITY

Well Known Company will shortly have capacity on the following machines:—
Heavy Centre Lathe.
Wheel Lathes.
Vertical Borers (up to 72in.).
Horizontal Borers.
Planing (up to 8ft. × 6ft. × 25ft.)
Also fabrications if required.
Apply BOX C977, MACHINERY, Clifton House, Euston Road, N.W.1.

Please make a note of our telephone number:—**DUDLEY 55103-4.**

AUTO SCREW PRODUCTS LTD.
Castle Works, Tipton Road, Dudley, Worcs.,
have capacity available for automatic screw machine work, capstan milling, drilling and presswork. Repetition products for all industries made to customers' specifications in any quantity. Nuts, Bolts, Screws, General turning, tool design and manufacture.

DELANCEY
TOOL & ENGINEERING WORKS LTD.
A.I.D., ADMIRALTY & WAR OFFICE APPROVED

CAM CUTTING & GENERAL MACHINING
FITTING & EXPERIMENTAL WORK
PROMPT SERVICE
DELANCEY ST. LONDON, N.W.1
Telephone: GULLIVER 3448

Automatic Capacity Available up to ½in. dia.—HATFIELD AUTOMATICS, 26, Park Street, Hatfield, Herts. Tel.: Hatfield 2159.

AUTO CAPACITY
6in. and 4in. Chucking.
$\frac{3}{16}$in.-2in. dia. Bar, A.I.D., A.R.B. approved.
HUNTLEY & SPARKS LTD
James Estate, Western Road, Mitcham, Surrey

CAPACITY FOR CENTRELESS GRINDING...
·01in. UP TO 3·50in. DIA. TO PRECISION LIMITS ON 'CINCINNATI' AND OTHER WELL KNOWN MAKES OF MACHINES

ALLEYNE FOSTER ENG Co LTD
ESTABLISHED IN 1924
59 South St., Epsom, Surrey, Epsom 2198

Precision Machined Parts . . .
D.G.I. Approved. Milling, Grinding, Turning, Capstan, Thread Milling, Centreless Grinding also Profile Tool Grinding. Jig Boring, Toolmaking.
Send your specifications to:—
ALEXANDER BROS., Dolphin Works, Godalming, Surrey.
Tel. Godalming 731.

Immediate Grinding Capacity available. High Precision surface, cylindrical and form grinding of all materials. Manufacturers of "Special" Tipped Tools. Express delivery service for urgent requirements.
THE NEW ZIPPER CO., LTD., 72B, Buckingham Avenue Trading Estate, Slough, Bucks. Tel.: 25612.

R. WEBB
PRECISION & GENERAL ENGINEERS
Prototype & development work undertaken, and machining for all industries.
24 Amwell St., Hoddesdon, Herts. Hoddesdon 4432

Classified Advertisements (*CONTRACT WORK, contd.*)

PRECISION TURNED PARTS
D.G.I. and A.R.B. APPROVED
AUTO & CAPSTAN QUANTITIES
Send your specification to:
AYLESBURY TURNED PARTS (True Screws) Limited
Britannia St., AYLESBURY, Bucks.
Telephone: AYLESBURY 2424 (3 lines)

Automatic and Capstan Capacity Available up to 2in. dia.—WILLIS ENGINEERING, 65, High Street, Hampton Hill, Middlesex. Molesey 4273.

Automatic Capacity Available on single spindle machines.—BARMAC ENGINEERING COMPANY, Bridge Works, Iver Lane, Cowley, Middlesex. Telephone: Uxbridge 38839.

Planing Capacity, Heavy or Light Turning up to 5ft. diameter. Special machines to customers' design. F. ATKINSON & SONS (LONDON), LTD., 45, King's Cross Road, W.C.1. Terminus 4050

Capacity Turning, Capstan milling, drilling, die and tool making. —MILLS ENGINEERING PRODUCTS, LTD., Barnet. Tel.: BARnet 6744.

Automatic Capacity Available, Index single spindle Autos. up to 2⅛in. diameter. Centreless Grinding Capacity ⅛in. to 5in. diameter.
JAN PRECISION SCREWS, 629, Spur Road, Feltham, Middlesex. Telephone: Feltham 4282/3.

Multi-spindle and Single-spindle Auto Turning up to 2in. bar capacity. capstan turning from the bar up to 2½in. dia. chuck work up to 14in. dia., thread milling, milling, shaping, drilling, etc. capacity available. Any tolerance and quantity. Satisfaction absolutely guaranteed.—UNICORN PRODUCTS, LTD., 119-121, Stanstead Road, Forest Hill, S.E.23. 'Phone: FORest Hill 7688 (8 lines).

FINE LIMIT GRINDING
MILLING, TURNING, DRILLING.
Complete Service Offered.
SETON CREAGHE ENGINEERING LTD.,
Trading Estate, Park Royal Road, N.W.10
A.I.D. ELGar 3356/7 A.R.B.

Automatic Capacity Available. Index Autos. up to 2¼in. diameter. Chucking up to 5in.
JAMES HARRINGTON, Magda Works, Walton-on-Thames. Tel.: 26099 & 25614.

Capstan Capacity Immediately Available, 8 BA-1¼in. Steel or Brass Large stocks of raw materials.
SACRON, LTD., 7, Chiswick High Road, W.4. Tel.: CHIswick 3595.

High Precision Grinding of Tungsten Carbide and Steel Tools. Accurate profile grinding and progression tools a speciality.—S.T. LTD., 22-26, Upper Mulgrave Road, Cheam, Surrey. 'Phone: Vigilant 0074/5.

Capstan Capacity Immediately available 10 BA to 1¼in. B.M.S. Stainless, Brass, etc. All materials in stock.—CHISWICK ENG., LTD., Pluckington Place, Southall, Middlesex. Tel.: Southall 2247.

CENTRELESS GRINDING SPECIALISTS
BAR GRINDING
$\frac{1}{16}$in. TO 5in. DIA. UP TO 15ft. LONG
all types of infeed, through and plunge
A.I.D. APPROVED
IMMEDIATE CAPACITY ON CAPSTAN, MILLING CENTRE LATHES, AUTO AND ALL TYPES OF GRINDING
REDCAR ENGINEERING CO. LTD. *Tel:* POPESGROVE 1005/6/7
8 STATION YARD GROSVENOR RD TWICKENHAM MIDDX

AIRCRAFT UNIT ENGINEERING CO.
Invite quotations for machining capacities
A.I.D., A.R.B., AND LIMITED A.R.B. DESIGN APPROVAL
Turning, Capstan and Centre Lathe. Milling, Universal, Profile. Grinding, universal, surface, centreless, etc. (up to 86in. x 15in. dia. Plain Cylindrical)
Screw Cutting (Cridan machines) and Thread Milling
General Assembly Work Modern plant producing High Quality work
18-19, Greenhill Parade, Great North Road, New Barnet, Herts.
Telephone: BARnet 6471 and 7479

Thread - Grinding.
SCREW THREADING TOOLS, LTD., 226, Middlewood Road, Sheffield, 6.

Automatic Capacity Available. B. & S. up to 1¼in. dia. C.B. AUTOMATICS, Bridge Works, Iver Lane, Cowley, Middlesex. Tel.: Uxbridge 33428.

Spur Gear and Sprocket Cutting from blanks supplied or machined complete. 'Phone: EUSton 1354.
TURNER BROS., 10, Pratt Mews, Camden Town, N.W.1.

WE MAKE TANKS, FRAMES, DUCTS, INSTRUMENT PANELS AND CHIMNEYS
Let us have your enquiries for welded fabrications large or small. And we can press 200 Tons, guillotine bend and cylindrical roll ½in. plate.
SHELMERDINE & MULLEY LIMITED
EDGWARE ROAD, CRICKLEWOOD N.W.2.
Tel: GLAdstone 7677-8.

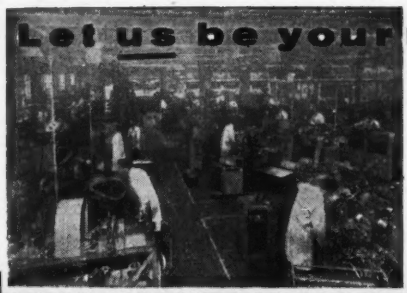
Gear Cutting, Auto Turret, Capstan and Centre Lathe Turning, Milling, Planing, Hardening and Grinding, Profile Cutting and Welding.
SMITH & NETHERWOOD, LTD.
Tanyard Road, Quarmby, HUDDERSFIELD.
Phone: MILNSBRIDGE 1865.

Automatic Capacity Available on Index single spindle autos, up to 2½in. dia. —ARTHURS ENGINEERING, LTD., Hersham Trading Estate, Molesey Road, Hersham, Surrey. 'Phone: Walton-on-Thames 21277.

Automatic Capacity Immediately available. Swiss type machines up to ½in. dia.—E. V. IRONS, Clovelly Works, 272, Acton Lane, Chiswick, W.4. CHIswick 1007

Precision Turned Parts, Auto ½in., Capstan 2in. Milling, Grinding, Heat Treatment, etc. A.I.D., A.R.B.
S.M.E. LTD., Steyning, Sussex 'Phone Steyning 2228.

E. R. LATTIMER LTD AID & ARB APPROVED
Offer complete Service for
PRECISION PROFILE MILLING, JIG BORING
CENTRELESS, SURFACE AND UNIVERSAL GRINDING
LIGHT TO MEDIUM COMPONENT MANUFACTURE
TOOL DESIGN & MANUFACTURE
SMALL ASSEMBLIES, DIE & MOULD MANUFACTURE
SMALL PRESSURE DIE CASTING IN MAZAK ALLOY TO BS 1004
SUPER PRECISION HYDRAULIC COMPONENTS AND ASSEMBLIES
FOR WHICH WE HAVE HYDRAULIC TESTING EQUIPMENT
SHAKESPEARE STREET SOUTHPORT
Phone: 57696/7



COMPLETE FACILITIES
plus precision and service second to none!

Capstan and centre lathe work · Milling—all types
Surface and universal grinding · G-SIP jig boring . . .
as well as drilling, shaping, honing, centreless grinding, copy turning, thread milling, "Cridan" screw cutting, toolmaking etc., to suit your every need.

A I D & A R B

Telephone · Elmbridge 5333 (3 lines)
MARSDEN & SHIERS LTD · DAVIS ROAD · CHESSINGTON · SURREY

Automatic Capacity Available, Index single spindle autos, up to 1¼in. dia. —PRESS & PRODUCTION MACHINE TOOLS, LTD., 97, High Street, Teddington. TED Lock 4032.

Centreless Grinding Capacity Infeed Plunge ¼in. to 4in.—CHISWICK ENG'G., LTD., Pluckington Place, Southall, Middx. Tel.: Southall 2247.

•PRESS WORK•

TREVENA & GLOVER LTD
Specialists in Intricate Presswork
309-312 ICKNIELD STREET
BIRMINGHAM 18.
Quality contacts for the Electrical Industry.
Small and Medium Presswork in all ferrous and non-ferrous metals.
Telephone: B'ham Northern 0258.
ON AIR MINISTRY LIST
CONTRACTORS TO THE G.P.O.

NAISH BROS. & CO. LTD.,
KNAPPS LANE, ST. GEORGE,
BRISTOL 5 Tel: 657204/5
PRESS TOOLS
FIXTURES
SPECIAL MACHINES
PRESSINGS
GEARS

Press Productions
Pressings on auto or hand fed presses. Immediate capacity up to 40 tons. Production from our, or customer's tooling. A.I.D. approved.—Summersby Road, Highgate, N.6. TUDor 9851.

A.I.D., C.I.A., A.R.B., APPROVED
WELDING & FABRICATIONS
PRESSINGS
PRESS CAPACITY UP TO 1000 TONS
· ALL MATERIALS ·
POLARCOLD LTD.,
CONGLETON · CHESHIRE TEL. 2401/3

SUB-MINIATURE PRESSINGS
and multi-stage precision presswork in all materials
PROMPT DELIVERIES
G. A. PRECISION PRODUCTS LTD.
No. 2 Factory Darkes Lane, Potters Bar, Middlesex
Potters Bar 6895.

Pressings in all Metals up to 60 tons. Press tools manufactured in our own toolroom. Light assemblies. Domestic Electrical and Mechanical. All finishes. A.I.D and A.R.B. approved. Advice and estimates given free. Inquiries to:—
METAL COMPONENTS, LTD.,
Dolphin Road, Shoreham-by-Sea, Sussex.
'Phone: Shoreham-by-Sea 2224/5.

RELIABLE SERVICE · COMPETITIVE PRICES · A.I.D. APPROVED

PRESS WORK
INCLUDING DEEP DRAWING, WELDING AND SUB-ASSEMBLY
to any tolerance, shape or quantity

Pressings and Stampings, Ltd., Eccleston Road, West Ealing, W.12. Presswork up to 130 tons. Double action deep drawing guillotine 8ft. by 10 s.w.g. Spot-welding. Assembly. Toolmaking and electro-plating.—'Phone: Ealing 3667-8.

METAL SPINNINGS
IMMEDIATE CAPACITY FOR METAL Spinnings, Sheet Metal Work, Welding. A.I.D. Approved M.O.S. Ref. 8026/57
HIGHBURY METAL SPINNING CO. (1955) LTD.
30 HIGHBURY PLACE, N.5. CANonbury 2906

ECONOMIC STAMPINGS LTD., DISRAELI ST. LEICESTER Tel: 32233

••TOOLMAKING••

PRECISION PRESSWORK
Own Toolroom
Double action deep drawing
Double roll feeds
HOLLY ENGINEERING (Drayton) LTD
COLHAM AVENUE · YIEWSLEY · MIDDLESEX
Telephone: West Drayton 2870

GROSVENOR WORKS (Holloway) LTD.
Station Road, Tottenham Hale, N.17
Telephones: TOTtenham 7782/3
PRECISION ENGINEERS
Press Tools. Metal Stampings.
Special Purpose Machines.
Precision Machined Components.
Jig Boring.

EST° 1889
R. STEPHENS & SON LTD
PRESS TOOLS · JIGS
FIXTURES · MOULDS
GAUGES · DESIGNS
115 CHURCH ROAD
UPPER NORWOOD
LONDON S.E.19
PHONE
LIVINGSTONE
2265-6

HIGH QUALITY
PRESS TOOLS
MULTI-OPERATION TOOL
•SPECIALISTS•
STAMPINGS IN ALL MATERIALS
FIXTURES - JIGS - MOULDS
SPECIAL PURPOSE MACHINES
W. T. Atkin (TOOL) Ltd.
178 ST. ANN'S ROAD, LONDON N.15
Telephone: STAMFORD HILL 6686-7

SIGN OF
KEMWORTHY
A GOOD TOOL

Send Us Your Enquiries

'PHONE:
LIBERTY 5203.

THE KEMWORTHY JIG & PRESS TOOL COMPANY LTD.,
NELSON WORKS, LYON ROAD, MERTON, LONDON, S.W.19.

MACDOWALL

JIGS, FIXTURES
PRESS TOOLS & GAUGES
PRECISION ENGINEERS
SPECIAL MACHINERY

MACDOWALL EQUIPMENT
COMPANY LIMITED
NORTH STREET
ROMFORD, ESSEX

ROMFORD 61981

KEMP
PRECISION TOOLING LTD
37 JUNCTION ROAD,
CROYDON, SURREY
TELEPHONE: CROYDON 5658

PRESS TOOLS, JIGS
GAUGES, MOULDS
SPECIAL PURPOSE MACHINES
PROFILE GRINDING
PRECISION COMPONENT PRODUCTION
JIG BORING

Classified Advertisements (*CONTRACT WORK, contd.*)

COVENTRY GRINDERS LTD

AID, ARB Approved Phone 73344

Send us your enquiries for

GAUGES, FORM TOOLS, DIES, PROTOTYPE, COMPONENTS, MANDRELS, CRUSHERS, JIGS, GEAR CUTTING, OPTICAL FORM GRINDING, CENTRELESS INTERNAL, EXTERNAL, SURFACE.

ALL SIZES OF PRECISION GROUND GAUGEPLATE IN STOCK

$\frac{1}{32}$ to 18in. WIDE

$\frac{1}{32}$ to 1½in. THICK

18in. to 48in. LONG.

JIG BORING

ON SIP JIG BORERS

EDMONTON TOOL & ENG. CO. LTD

141, HERTFORD ROAD EDMONTON N.9

TELEPHONE: EDMONTON 4412/3

SPURS, SPIRALS, BEVELS, WORMS & WORMWHEELS

GEAR CUTTING

QUALITY TOOLS

PRESS TOOLS • JIGS • FIXTURES

SPECIAL PURPOSE MACHINES

MACHINING

MAYSMITH

ENGINEERING CO. LTD.

290a High Road, Willesden, N.W.10

A.I.D. Tel: WIL 6688/9 A.R.B.

Kellering and Cam Profiling capacity up to 8ft. by 6ft. or 6ft. diameter.

ARMYTAGE BROS. (KNOTTINGLEY), LTD.,

The Foundry, Knottingley, Yorkshire.

Telephone: Knottingley 2743/4.

JIG BORING

JIGS - FIXTURES

PRESS TOOLS

PROTOTYPE MACHINING

WEST GREEN TOOL CO.

KINGS ROAD · WOOD GREEN · N.22

Telephone: BOWES PARK 5144

Press Tools, Jigs and Fixtures Light Pressings up to 40 tons.—SPENCE TOOLS, LTD., 361a, Oxford Avenue, Trading Estate, Slough. Tel.: Slough 22394.

Press Tools, Press Work, Capstan Turning and General Machining. Components manufactured and assembled to specifications.—L. PERSON & SON, 68, Shaftsbury Street, London, N.1. CLE. 7139.

SPECIALITIES

Universal Ball Bearing Co.

111-115 Hammersmith Grove, London, W.6

FACTORS MANUFACTURERS AND REPAIRERS

Phone: Riverside 3261-2-3-4 *Grams:* "Universal Bearing Hammersmith"

LISTERS SOFT JAWS

PRATT, COVENTRY AMERICAN & CONTINENTAL

Please send your enquiries to:

SOLE AGENTS LONDON & SOUTH

W. J. L. (MACHINERY) LTD.

DACRE HOUSE, DEAN FARRAR STREET, LONDON, S.W.1. *Tel: WHitehall 2018*

ROTARY COMPRESSORS & EXHAUSTERS

Manufactured by

THE HAMMOND ENG. CO., LTD.,

Chase Side, Enfield, Middx.

Telephone: ENF. 1323 (3 lines)

The "Coxeter" Revolving Centre from 70s. All sizes from stock.—REVOLVING CENTRES, LTD., Oxford.

TIME RECORDERS—Sales— Rental Service: Tel. Hop. 2239.

TIME RECORDER SUPPLY & MAINTENANCE CO., LTD., 157/159, Borough High Street, London, S.E.1

BALL & ROLLER BEARINGS

THE WORLD'S LARGEST SELECTION OF

BRITISH, AMERICAN AND CONTINENTAL BEARINGS IN ALL TYPES AND SIZES

IMMEDIATE DELIVERY FROM STOCK · KEENEST PRICES

CLAUDE RYE BEARINGS

895-921 FULHAM ROAD · LONDON · SW6

PHONE: RENOWN 6174 (Ext. 24) · TELEX 23453 · CABLES: RYE BEARINGS, LONDON

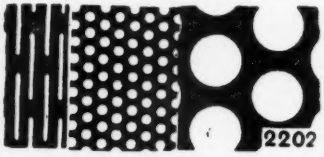
Slough Branch: 80 BATH ROAD, SLOUGH Phone: SLOUGH 22354

Kingston Branch: 88 LONDON ROAD, KINGSTON Phone: KINGSTON 6755 & 4142

DONOVAN
FOR THE
MACHINE TOOL BUYER
WHO REQUIRES
PLASTIC INSULATION CABLES, P.V.C. COVERED & PLAIN FLEXIBLE CONDUIT, B.S.A. ACME SNAP-LOCK LIMIT SWITCHES & MICRO LIMIT SWITCHES AMMETERS, H.R.C. FUSE CARTRIDGES & SLYDLOCK FUSES, FLUSH MOUNTING ISOLATING SWITCHES, BILL & M.E.M. SWITCHGEAR.
The Donovan Electrical Co. Ltd.,
(Wholesaling Division)
Granville Street, Birmingham, 1

For PRECISION
BELLEVILLE WASHERS
Supplier
INDUSTRIAL TRADING CO. LTD.
P.O. BOX 51 WORCESTER

Other Products Include:
Annular Grip Springs
Electro-magnetic Tooth Clutches
Laminated Shims
Lock Washers (standard)
Wiper Rings



H. GRAEPEL, Ltd.
KINSALE, CO. CORK 12
MAKERS OF PERFORATED METAL

MACHINE ENGRAVING CAPACITY
FIRST CLASS WORK PROMPT DELIVERY
also all types Dials, Nameplates, Plastic Motifs, Panels, Scales, etc.
FOR SERVICE RING CHING Boxmoor 6400/1
RICHARD CHING & SON LTD.,
Duxons Turn, Maylands Ave.
Hemel Hempstead, Herts.

LAPPEX
micronised
LAPPING COMPOUND
for machine and hand use
Gives a superfine scratch-free Mirror finish on steels, non-ferrous metals and many plastics.
Lappex 7/6 tube 20grms
Lappex Vehicle 3/- tin 4ozs
THE GENERAL ENGINEERS SUPPLY CO (1937) LTD
555 High Rd. Leytonstone E.11
Ley 6677 & 5685

Tungsten Carbide Tool
Manufacturers of standard and special form tools in high speed steel and tungsten carbide.
Our range includes reamers, cutters, workrest blades and wear-resistant parts.
Carbide supplied to customers specifications and express service given for emergency tooling.
DIAGRIT GRINDING CO., LTD.,
Station Road, Staplehurst, Tonbridge. Kent.
'Phone: Staplehurst 449.

ABOUT AMMUNITION BOXES
THOUSANDS OF STEEL AND WOODEN BOXES OF ALL SIZES
Ideal for all Types of Packing & Storage purposes.
For particulars and prices apply:—
O.K. TRADING (B'HAM FACTORS) LTD.
78-84, MOAT LANE, B'HAM 26
STEchford 4351/2 P.B.X.

HESLEIN
TOOL CHESTS
All drawers run on patented rollers.

F. C. NIELSEN & SON
31-45 Cumech St., LONDON, N.W.1. - EUS 2054

'SUPER' PIPE UNIONS
with Patent Conical Joint. Can be used on Superheated steam.
WALTER SLINGSBY & CO., LTD
WASK WORKS · KEIGHLEY

PACKING AND SHIPPING
R. & J. PARK, LTD., Dominion Works, Chiswick, England. Export packers, shippers, and forwarding agents, specialists in packing heavy machinery.

ANNOUNCEMENTS

PHOTOGRAPHY

Miles & Kaye, Ltd., 102, Southampton Row, London, W.C.1. Holborn 6858. Specialists in commercial and industrial photography for over 60 years. All branches of photographic work undertaken.

Photographs by MACHINERY set the standard in engineering publicity. Our studio is one of the best equipped in the country. Ideal for really good photography of tools, attachments and portable equipment. Mobile units available for taking photographs in black and white or in natural colour in your own or your customers' works. Specimens of work submitted on request.—Full particulars from the SERVICE MANAGER, MACHINERY PUBLISHING COMPANY, LTD., National House, West Street, Brighton, 1.

•WORK TO PLACE•

Large Company Making Special machinery seeks capacity for complete manufacture and building of their machines.—Please write in the first place with full details of company, list of plant, and giving details of normal business, to BOX C796, MACHINERY, Clifton House, Euston Road, N.W.1.

Large Engineering Company in London wishes to sub-contract work in the following capacities. Medium Capstan, Turret Lathes, Vertical and Horizontal Boring, Medium and Large Planing, Milling, Radial Drilling, Grinding, Centre Lathes, etc.—Please send particulars of plant to BOX C715, MACHINERY, Clifton House, Euston Road, N.W.1.

PATENTS—TRADE MARKS

Kings Patent Agency, Ltd.
E. T. KING, A.M.Inst.E.,
Registered Patent Agent.
146A, Queen Victoria Street, London, E.C.4.
City 6161. Booklet on Request.

The Proprietors of British Patent No. 791,357, for "Bearing Arrangements for the Rotors of Rotary Piston Prime Movers or Driven Machines for Gaseous or Vaporous Media," desire to enter into negotiations with a firm or firms for the sale of the patent or for the grant of licences thereunder. Further particulars may be obtained from Marks & Clerk, 57 and 58, Lincoln's Inn Fields, London, W.C.2.

Classified Advertisements (ANNOUNCEMENTS, contd.)

AGENCIES

Old Established and Busy Engi- neering Distributors in North Midlands city having several first class Engineering Agencies would like one or two more non-competitive lines.—Firms interested please write BOX C995, MACHINERY, Clifton House, Euston Road, N.W.1.

BUSINESS OPPORTUNITIES

Light Engineering Business situated in Penzance, Cornwall, district. Good Plant and Equipment. Unlimited work available. Ideal surroundings and good buildings. Freehold Property with ample room for expansion. An excellent opportunity for a go-ahead engineer or concern.—For further particulars write BOX C999, MACHINERY, Clifton House, Euston Road, N.W.1.

Well Established Midland Firm of Agents, desire to contact Drop Forging Company with available capacity.—BOX C994, MACHINERY, Clifton House, Euston Road, N.W.1.

Heavy Fabrication and Planing (18ft. × 12ft.) capacity available.—JOHN CURRAN, LTD., G.P.O. Box 27, Cardiff.

MATERIALS FOR SALE

Storage Bins, 18in. × 10in. × 5in. deep 3s., Pressed Steel Shelves 4ft. 6½in. × 9½in. × 16 gauge 2s. 6d. Good condition.—LOWTON METALS, LTD., Sandy Lane, Lowton St. Mary's, Leigh 71441/2.

Bolts. Bright Mild Steel Hex. Head to British Standard Specification Cadmium plated and Releasable A.R.B. or D.G.I.

20 gross 6A1/19E ⅜in. BSF × 2¾in. Shank, 0.42 full thread. 6s. per gross.
33 gross 6A1/10G ⅜in. BSF × 1¼in. Shank 0.47 full thread. 7s. per gross.
19 gross 6A1/31G ⅜in. BSF × 3¾in. Shank 0.47 full thread. 12s. per gross.
3 gross 6A1/11J ⅜in. BSF × 1¾in. Shank. 0.595 full thread. 12s. per gross.

CURD COMPONENTS LTD., 9, Brownfields, Welwyn Garden City, Herts. (Tel. WG. 25471.)

E. Stephens & Sons Ltd., Bath Street, London, E.C.4. CLE. 1731. Tube Rounds, Flats, Hex., cut to size. Quick delivery.

MATERIALS WANTED

£200,000
AVAILABLE FOR THE PURCHASE OF
NEW BALL & ROLLER
BEARINGS
OF ALL TYPES & SIZES
BY BRITAINS BIGGEST BUYERS
CLAUDE RYE BEARINGS
895-921 FULHAM RD. LONDON SW6
RENOWN 6174 (Ext 24). TELEX 2-3453

PLANT WANTED

WE WILL PURCHASE Modern quality machine tools for cash. Whole plants or individual items. Full details to:—
HARRY KIRK ENGINEERING, LTD.,
Machine Tool Division,
Brandon Road Works,
Brandon Road, Coventry.
Telephone: Walsgrave-on-Sowe 2253/6.

B.G. MACHINERY, LTD., Montgomery Street, Sparkbrook, Birmingham, 11, will pay good prices for Machine Tools of first-class make and in good condition.—'Phone: VICtoria 2351/9.

Longford Machine Tool Co., Ltd., Longford Road, Coventry, will pay good prices for any type of machine tool which is in good condition, and is of first class make. Only machines motorised 400/3/50 will be considered. —Write or 'phone Coventry 87481/2.

Wanted, Twin Saddle Lathe and Honing Machines, any size, Monarch and Barnes Drills preferred.—MICROFINISH LTD., Exeter Parade, London, N.W.2. Telephone: Gladstone 1353.

Wanted, Brown & Sharpe and C.V.A.8 Single Spindle Automatic.—MELBOURNE ENGINEERING CO., LTD., Melbourne, Derbyshire. 'Phone: Melbourne 282.

Albert Edwards
(MACHINERY) LTD.,
79/89 PENTONVILLE ROAD
LONDON, N.1.
Telephone: TERminus 0167/8/9
We are buyers of good modern machine tools

WANTED!
GOOD CLASS MACHINE TOOLS POWER PRESSES & SHEET METAL MACHINERY
EDWIN MILLEN & SONS LTD.
70 Clerkenwell Road, London E.C. 1
'Phone: CLErkenwell 6064

A. LAWRENCE & CO. (MACHINE TOOLS) LTD.
will be pleased to purchase your surplus Modern Machine Tools either on a cash or part exchange basis. Ask our representative to call and inspect.
Welsh Harp, Edgware Road, London, N.W.2
Telephone: GLAdstone 0033

HIGHEST PRICES PAID FOR.....
MACHINE TOOLS • PRESSES • PLATE & SHEET METAL WORKING MACHINERY • TIN BOX MAKING MACHINERY • WOODWORKING MACHINERY
Outright purchase or in part exchange
F. J. Edwards Ltd
EDWARDS HOUSE, 359-361, EUSTON RD., LONDON, N.W.1
Telephone: Euston 5000 Telex 24264
41, WATER STREET, BIRMINGHAM 3 Telephone CENtral 7606-8

When answering advertisements kindly mention MACHINERY.

WANTED

Good Class Used
MACHINE TOOLS

Write or phone
STANCROFT LTD
BEDWORTH ROAD,
COVENTRY
Telephone: Coventry 88072

DOUGLAS
OF HIGH WYCOMBE

- ★ We would be pleased to Purchase your surplus Modern Machine Tools.
- ★ Generous offers made for Latest Style Machines.
- ★ Inspection Arranged at Once.
- ★ Britan Repetition Lathes a Speciality.
- ★ Cash or Part Exchange Basis.

A. DOUGLAS CO. LTD.
LINCOLN ROAD,
HIGH WYCOMBE,
BUCKS.
Tel: H.W. 4390 (5 lines).

WANTED GOOD MACHINE TOOLS
Offer your Surplus Tools to us.
We pay a good price.
M. WARD
(MACHINE TOOLS) LTD.
1, KILBURN HIGH ROAD,
LONDON, N.W.6.
Telephone: MAIDA VALE 1195-96.
Telegrams: Emwarneers, Kilb, London.
One minute from Kilburn Park Station, Bakerloo Railway.

WANTED
All types of modern
MACHINE TOOLS
Chipping Sodbury 3311
NEWMAN INDUSTRIES LIMITED
YATE · BRISTOL

WANTED
MODERN MACHINE TOOLS
We pay cash for single machines or complete plants
SEND US DETAILS
IMMEDIATE INSPECTION ARRANGED
SOUTHERN ENGINEERING AND MACHINERY CO.
CONNAUGHT BUILDINGS,
TANNERS BROOK, MILLBROOK,
SOUTHAMPTON
Telephone: Southampton 73101/2/3

Wanted Urgently
Late Type Machine Tools
Best Prices are offered for latest types of Machine Tools. Send us details of what you have and our representative will call to inspect.
J. B. MACHINE TOOL CO. LTD.
312 BRADFORD ST., BIRMINGHAM 5
Telephone: MIDland 4375

Machine Tools, Power Presses and Sheet Metal Machinery. Single machine or complete plant purchased. Immediate Inspection.—ALBERT EDWARDS (MACHINERY), LTD., 79/89, Pentonville Road, London, N.1.

SURPLUS MACHINE TOOLS REQUIRED
OFFER YOUR MACHINES TO
J. E. RAISTRICK LTD.
POYLE TRADING ESTATE
COLNBROOK, SLOUGH,
BUCKS.
TEL: COLNBROOK 2421

WANTED!
USED MACHINE TOOLS
We offer generous prices for your plant or accept in part exchange for modern equipment
E·H·JONES
(MACHINE TOOLS) LTD
48, HIGH STREET, EDGWARE
Telephone: EDGware 4488
Midland 5593 - Birmingham

WE ARE KEEN BUYERS OF GOOD MODERN MACHINE TOOLS. INSPECTION WILL BE ARRANGED AT ONCE.
M. C. LAYTON LTD.
Abbey Wharf,
MOUNT PLEASANT
ALPERTON, MIDDLESEX
Telephone: WEMbley 9641-8

Small Centreless Grinder and Automatic Cycle Tapper, preferably Huller ¼in. or 1in. capacity.—SCOTT ENGINEERING (BOURNEMOUTH), LTD., 68, Old Wareham Road, Parkstone, Poole, Dorset. Parkstone 4455/6.

Power Presses, Power Guillotines. Sheet Metal Machinery, urgently required.—STANCROFT LIMITED, Lancaster St., Birmingham, 4. Aston Cross 3741 or 2236.

FRYE MACHINE TOOL COMPANY LIMITED

arrange immediate inspection of good class plant

POYLE ROAD · COLNBROOK · SLOUGH · BUCKS · COLNBROOK 2442/3/4

NEAR TO LONDON AIRPORT

MODERN MACHINE TOOLS & SHEET METAL MACHINERY
WANTED
SINGLE MACHINE OR COMPLETE PLANT PURCHASED
W. FORREST & CO. LTD.
Sylvester Gardens, SHEFFIELD 1. 'Phone 23314/5

Capstans Required in Good Condition. One each Ward 2A, 3A and ¼in. Britan.—Please reply with all details to BOX C998, MACHINERY, Clifton House, Euston Road, N.W.1.

WE ARE SEEKING GOOD CLASS USED MACHINES AT THE PRESENT TIME FOR WHICH WE WILL PAY ATTRACTIVE PRICES

TATE

TATE MACHINE TOOL CO., LTD.
348-354, KENSINGTON HIGH STREET
LONDON, W14 · WEStern 7031 (5 lines)
TELEGRAPHIC: TATE TOOLS, LONDON

CENTAUR TOOL WORKS, Birmingham, 18, pay best prices for good modern secondhand Machine Tools by first-class makers. Write or 'phone and our representative will call.—'Phone: EDGBASTON 1118 and 1119. Grams: Capstan, Birmingham.

Modern Good Class Machine Tools and Sheet Metal Machinery required for prompt cash.—H. BELL (MACHINE TOOLS), LTD., Walter Street, Leeds, 4. Tel. 63-7398.

Gap Gauge Grinding and Lapping machine wanted.—BOX C996, MACHINERY, Clifton House, Euston Road, N.W.1.

PLANT FOR SALE

HENRY BUTCHER & CO.
Specialists in the
• VALUATION AND SALE OF FACTORIES, PLANT AND MACHINERY •
73 CHANCERY LANE, LONDON, W.C.2
TEL.: HOLBORN 8411 (8 lines) GRAMS: PENETRANCY, HOLB., LONDON

---

200 Ton Friction Screw Press. Bed 21in. × 29in. With bottom extractors, 24 h.p. M/D.—BOX C975, MACHINERY, Clifton House, Euston Road, N.W.1.

Churchill Hydraulic Cylindrical Grinder. Model BY. Capacity 10in. × 20in. Hydrauto bearings. Motorised.—WILCOX & CO., Barr Street, Birmingham 19. NORthern 1234/5.

NEW MACHINES EX STOCK

LATHES

BINNS & BERRY Lathe, 12½in. × 7ft. 6in. b.c.
BROADBENT Lathe, 8½in. × 10ft. b.c.
WOODHOUSE & MITCHELL 7in. × 3ft. b.c
WILLSON 7½in. × 3ft. b.c.
CARDIFF 9½in. × 4ft. b.c.
CARDIFF 11in. × 6ft. 8in. b.c.

EARLY DELIVERIES

LATHES

COLCHESTER 6in., 7½in., 8½in.
WOODHOUSE & MITCHELL 8½in.

R. KELLY & SONS LTD.,
LIVERPOOL—ROY 4463

New 6ft. 0in. × 3ft. 6in.; 7ft. 0 in. × 4ft. 0in.; and 10ft. 0in. × 3ft. 0in. Marking Off Tables for sale. Accurately machined top face and heavily ribbed. Mounted on cast iron legs. Total height approx. 34in.—Illustrations and full details from F. J. EDWARDS LIMITED, 359, Euston Road, London, N.W.1, or 41, Water Street, Birmingham, 3.

Choose from
HUNDREDS of
MACHINE TOOLS
at the
FJE MACHINE CENTRE
Islington Park Street, London N.1.
(on the A1, near Highbury Corner)
Cash or monthly account, hire purchase, or by the FJE Machine Hire Plan
F. J. EDWARDS LIMITED
359-361 Euston Rd. London N.W.1

Furnaces—Birlec, High Speed Steel. Two Furnaces. Carbo-neutral Salt Bath. Birlec Cassel. Capacity 8in. × 14in. 1,400 deg. C. 400/440 volts. Complete with transformer, control panel, starter and time clock, exhaust-blower, also spare set of electrodes. Two sets of Resistance Liner Bricks.—Offers to LENCHS (BIRMINGHAM), LTD., Gt. Hampton Street, Birmingham, 18. NOR. 8421.

MAS VR2 36in. Radial Drilling Machine.—New ex stock.—C. DUGARD, LTD., Denmark Villas, Hove 32471.

16ft. Edwards Guillotine for steel plate cutting suitable for material up to ¼in. Recently overhauled completely, modified and fitted with air-operated Clutches. Private Sale.—Offers to BOX C998, MACHINERY, Clifton House, Euston Road, N.W.1.

Kearns No. 2 Patent Horizontal Boring Machine (Serial No. 3493), with facing chuck, verniers, etc., 3in. dia. spindle. Main table 2ft. 6in. × 4ft. 0in. Turntable 3ft. 0in. × 3ft. 0in. Motorised 400/3/50.—Apply: ROBERT CORT & SON LTD., Reading. Tel. 55046.

RING BELLS *for machine tools*
LEEDS 63-7398

NEWALL USED MACHINE DIVISION

HAVE AVAILABLE FOR EARLY DELIVERY

One NEWALL 2436 Jig Borer, fully rebuilt and carrying maker's guarantees.

One NEWALL No. 0 Jig Borer, fully rebuilt and carrying maker's guarantees.

Capacity: 18in. by 12in. Table 14in. Spindle Nose to top of table

One NEWALL 'L1' Internal Grinding Machine, 10in. by 24in. fully rebuilt and carrying maker's guarantees. Maximum Grinding Depth: 12in.

One NEWALL No. 1 Jig Borer, fully rebuilt and carrying maker's guarantees.

One NEWALL No. 2 Jig Borer, fully rebuilt and carrying maker's guarantees.

THE
NEWALL
USED MACHINE DIVISION
OUNDLE ROAD
ORTON LONGUEVILLE
PETERBOROUGH

Telephone: Peterborough 67116/7

THE SPOT ● TO WATCH!

FOR GOOD CLASS SECONDHAND MACHINES AT LOW COST

B.S.A. ¾in. Automatic.
B.S.A. No. 48 Automatic.
BROWN & SHARPE '00' Automatic.
BROWN & SHARPE 2G Automatic.
LIBBY 4R Capstan.
HERBERT 4BS Capstan.
CHURCHILL No. 1 Planetary Grinder.
LANDIS 4in. by 18in. Plain Grinder.
B.S.A. Centreless No. 7 Grinder.
SCRIVENER 1CA Centreless Grinder.
SMART & BROWN Internal Grinder.
PRECIMAX 6in. by 12in. Plain Grinder.
TRIUMPH Centre Lathe.
LEBLOND No. 15 R.P. Lathe.
VAN NORMAN Plain Mill.
ADCOCK & SHIPLEY No. 3 Hor. Mill.
MILWAUKEE Simplex 12/24 Mill.
CINCINNATI Model 08 Vertical Mill.
AJAX 16in. by 4½in. Mill.
KELLER 1210 Diesinking Machine.
CINCINNATI Hydrotel 28in. Vert. Mill.
MOREY 12M 2 Sp. Profiler.
TAYLOR & CHALLEN 1½B Press.
KITCHEN & WADE No. 2 Honing Machine
SENTINEL 25T Power Press.
17in. **ALBA** Shaper.
AMMCO No. 6 Shaper. 6in. Stroke.
RUSHWORTH Guillotine. 3ft.
EDWARDS Sheet Metal Folder. 36in.
6 **H.P.** Column type 'H' Gear.

LATE AMERICAN MACHINES
GLEASON 3in. Str. Bevel Gear Generator.
GLEASON 12in. Str. Bevel Gear Generator.
FELLOWS 7125 High Speed Gear Shaper.
FELLOWS No. 72 High Speed Gear Shaper
FELLOWS No. 7 High Speed Gear Shaper.
FELLOWS 75A High Speed Gear Shaper.
FELLOWS 61A High Speed Gear Shaper.
HEALD 72A3 Internal Grinder.
GLEASON No. 16 Spiral Bevel Hypoid Gear Generator.

All machines motorised 400/3/50 unless otherwise stated.

GOOD USED MACHINE TOOLS WANTED

E. H. JONES MACHINE TOOLS LTD.
48 HIGH STREET, EDGWARE, MIDDX.
PHONE EDGWARE 4488/9
78 WRENTHAM STREET, BIRMINGHAM 5, *Phone Midland 5593*

American First Class Machines of all types can be supplied from our American Showrooms. Send your enquiries to K & C MACHINERY, LTD., Stephen Street, Coventry. Telephone: Coventry 23669.

6ft. × ¼in. Frost M/D Overcrank Guillotine, with 19in. gaps. 4 h.p., 400/3/50 motor. Auto hold-down. Post-war machine.—LEE & HUNT, LTD., Crocus Street, Nottingham. 'Phone: 84246.

OLDFIELD & SCHOFIELD
21in. centre by 13ft. Gap Bed
HEAVY DUTY LATHE
Admit 6ft. between centres; 46in. swing over saddle; 62in. by 8¼in. swing in gap; 4¼in. hollow spindle. Taper turning attachment.
F. J. EDWARDS LTD.,
359-361, EUSTON RD., LONDON, N.W.1
Telephone: EUSton 5000 Télex. No. 24264
And at Lansdowne House, 41, Water Street, Birmingham, 3.
Telephone: Central 7606-8.

Two U-Arm Hancock Profiling Machines for sale in good working order. Cutting areas 60in. × 30in. and 40in. × 30in. Machines available for inspection under working conditions, in Norfolk.—BOX C966, MACHINERY, Clifton House, Euston Road, N.W.1.

New Pedi Power Tube End Profiling Machine for sale. With one set of tools for notching the end of ⅞in. O.D. tube × 18 S.W.G. wall thickness for 90 deg. connection on to ⅞in. O.D tube. The double cut is produced at one setting. With suitable tools max. capacity is 1⅛in. O.D. × 10 S.W.G. wall thickness tube.—F. J. EDWARDS LTD., 359, Euston Road, London, N.W.1, or 41, Water Street, Birmingham 3.

Power Press. Rhodes 100 Ton Double Crank, Double Sided, motorised press. Table size 60in. × 42in. 4in. Stroke. £450 0s. 0d.—MARTIN POOLE, LTD. 16/20, Wenman Street, Balsall Heath, Birmingham, 12. CAL. 3545.

Schuler Friction Screw Presses, 420 ton and 200 ton. Standard Electrics.—BOX C997, MACHINERY, Clifton House, Euston Road, N.W.1.

Herbert 18V Vertical Milling Machine—66in. × 12in.—speeds 20-534—rapids.—C. DUGARD, LTD., Denmark Villas, Hove 32471.

A Good Number of High-class Machine Tools always in stock. At ELLISON (SALFORD), LTD., Cook Street, off Chapel Street, Salford, 3, Lancs.

ACBARS LIMITED,

57a, HOLBORN VIADUCT, LONDON, E.C.1.

Telephone: Central 2287 Telegrams: Acfirb Cent. London

AVAILABLE FROM STOCK

All machines listed below are at our Works in Sutherland Walk, Walworth Road, S.E.17

AUTOMATICS

HERBERT Auto Juniors (2).
RYDERMATIC No. 12 Vertical Multi-Tool Lathe.

BROACH

FORST R1A5 Universal Vertical Broach for internal and surface broaching, 5 tons, 39½in. stroke. 1952 machine.

RADIAL DRILLS

New VOEST Swivel Head Radial, 1in. capacity, 3ft. 3in. radius.

GRINDERS

BROWN & SHARPE No. 2 Surface.
JUNG AS Internal.
CHURCHILL HBY Internal.
KEIGHLEY Type XL Hydraulic Plain Grinder, 6in. × 18in.
CHURCHILL 10in. × 24in. Universal.
LANDIS 12 × 48 Universal.
BROWN & SHARPE No. 3 Universal.
NORTON 14in. × 36in. Universal.
New BAMKIN Tool and Cutter.

CAPSTAN AND TURRET LATHES

LIECHTI PR Turret Lathe (Swiss).
GISHOLT IL Turret Lathes.
FOSTER No. 2B Turret Lathe.

CENTRE LATHES

SMART & BROWN Type M 4in. Precision.
WARD, HAGGAS & SMITH 8½in. Gap Bed, 36in. between centres.
CROMWELL 3½in. Precision.

MILLERS

ARCHDALE 14in. Manufacturing type.
CINCINNATI Type OK 18in. Horiz.
EDGWICK 18in. Horizontal.
ARCHDALE 20in. Twin Overarm Horizontal. Table 40in. × 10in.
KENT-OWENS 1-8 and 1-14 Hydraulic Production.
MILNES Sw. Hd. Vertical. Table 30in. × 8½in.
HERBERT 23V Vert. Table 68in. × 17in. 48in. traverse.
HOLROYD T117 Thread Miller.
HELLER Automatic Thread Millers (4).
ASQUITH HKO Duplex Keyseater.

PRESS

V & O. No. 11 Double Action. Approx. 10 tons. Roll feed. Max. draw 1in.

All machines motorised 400/3/50 unless otherwise stated.

Churchill 18in. × 6in. Surface Grinder—late machine.—C. DUGARD, LTD., Denmark Villas, Hove 32471.

9-Roll Plate Straightening Machine by Horn & Buire for sale. Capacity ½in. Maximum width admitted 61in. Diameter of rollers 6in. Motor drive through gearbox with 40 h.p. motor for 400/3/50. Weight about 10 tons.—F. J. EDWARDS LIMITED, 359, Euston Road, London, N.W.1, or 41, Water Street, Birmingham 3.

GRIDLEY Type L 5in. Auto.
LE BLOND No. 2 Deep Hole Drill.
LA POINTE HP30 Broach, 1952.
ELECTRAULIC VBH, 15 ton Broach.
HARRISON 12in., 13in., 17in. Lathes. NEW.
CINCINNATI I-18 Mill auto stop BLE.
BLANCHARD 18 Surf. Grinder.
VICTORIA U3 Monotrol Univ. Miller, 1953.
CONOMATIC 8 sp. 1⅛in. Bar Auto.
BROWN & WARD ⅞in. and 1¼in. Autos.
WARD 3A Capstans.
HERBERT 4 Senior Capstan.
CLEVELAND 1⅛in., 1¼in., 2in. and 2¼in. Autos.
MASSEY 5 cwt. Press Hammer, 1942.
Four **UNION** ⅞in. Pedestal Drills. NEW.
VICTORIA V2 Swiv. Head Mill, 1954.
BULLARD 16in. 6-sp. Mult-Au-Matic, 1943.
GLEASON 12in. Bevel Gear Gen., 1945.
FELLOWS 61A, 645A Gear Shapers.
BRYANT 16-38 Internal Grinder.
HEENAN-FROUDE Baling Pres, 1947.
SCHULER Vertical Dieing Press.
REDMAN 12 × 4 × 4 Planer.
HERBERT 9S Turret Lathe.
MILWAUKEE 2H, 2K, 3H, 3K Millers.
BLISS 304A 50 ton Press, 4in. stroke.
NORTON 14 × 72 Univ. Grinder.
BROWN & SHARPE No. 3 Univ. Grinder.
DEFIANCE 25A Horizontal Borer.
ARCHDALE 38in. Sens. Radial Drill.
NEWALL type L 10in. × 48in. Grinder, 1942.
BUTLER 8in. Toolroom Slotter.
HEALD 72A Internal Grinders (3).
NORTON 12 × 36 Universal Grinder.
WARNER & SWASEY 3, 5 and 2A Turrets.
BROWN & SHARPE No. 3 Vert. Mill, 1942.
PRATT-WHITNEY 12B 2-sp. Profiler, 1941.
EDGWICK No. 2 Universal Miller.
BARNES No. 2 Horizontal Hones (3).
CHURCHILL No. 1 Planetary Grinder.
OECUTT HM24 Gear Grinder, 1944.
BUTTERWORTH 1¼in. S.S. Auto.
GISHOLT 5 and 1L Turret Lathes, 1941-43.
GRIDLEY Model R, 2¼in. cap., 4-sp. Auto.
ARCHDALE 18in. and 30in. Vert. Mill, 1942.
CINCINNATI 2MH Plain Mills.
MONARCH Copying Lathe, 1946.
CHURCHILL PBH 12 × 36 Univ. Grinders.

All modern fully motorised machines.

HUNDREDS MORE.

J. B. MACHINE TOOL CO., LTD.,
312/4, BRADFORD STREET, BIRMINGHAM, 5.
Tel.: MIDLAND 4375.
AND AT WOLVERHAMPTON

SELECTED MACHINES

MATHEYS Jig Boring Machine. Type SP/30. No. 290. Speeds 145-2,000 r.p.m. Table 30in. × 9½in. 230/1/50.
JONES & SHIPMAN No. 540 Surface Grinder. Capacity 18in. by 6in., hydraulic table feeds. Magnetic chuck, electric coolant.
SOMUA Horizontal Milling Machine, table 67in. × 14½in., spindle speeds 32 to 1,250 r.p.m. No. 50 I.T. 18 feeds ⅛in. to 10⅛in. per min., power feeds and rapid traverse in all directions. 1952 machine.
VICTORIA P2 Horizontal Mill, table 45in. × 11in., 1959 machine in new condition.
HULLER UG5 Tapping Machine, capacity up to 1½in., pedestal machine with coolant, controlled pitch. Reconditioned.
HERBERT No. 2 Flash Tapping Machines, pedestal Machines, with coolant, controlled pitch. Late type Machines.

All machines motorised 415/3/50.

A. LAWRENCE & CO., (MACHINE TOOLS) LTD.,
WELSH HARP, EDGWARE ROAD, LONDON, N.W.2.
Tel.: GLA. 0033.

ELLIOTT
INVITES YOU

to see the range of

FINE MACHINE TOOLS *at*

B. ELLIOTT (MACHINERY) **LTD**

VICTORIA WORKS, LONDON, N.W.10
Tel. ELGAR 4050

DIMCO

DRUMMOND Model K Chucking Capstan Lathe.
10in. × 24in. **CHURCHILL** Universal Grinder.
No. 3 **GISHOLT** Bar Feed Capstan Lathes.
U.3 **VICTORIA** Universal Milling Machine with Vertical Head. As new.
No. 2 D.F. **SCRIVENER** Centreless Grinding Machine.
36in. × 10in. **FRITZ WERNER** Vertical Milling Machine, swivelling head.
P.24 **SNOW** Surface Grinder.
New—8in. **GEMINIS** Toolroom Lathe, without Copying Attachment.
No. 2 **WARNER & SWASEY** Chucking Capstan.
4ft. **ASQUITH** Universal Drill. Portable.
8½in. **LANG** S.S. & S.C. Lathe, 4ft. between centres.
New 7in. **WOODHOUSE & MITCHELL** Type 70 Junior Lathe.
20in. **ARCHDALE** Plain Milling Machine. Power feeds and rapids.
6in. **HOLBROOK** Toolroom Lathe.
14in. **BUTLER** Slotting Machine. Circular table.
8½in. **FABIUS** Lathe, 5ft. between centres. (New.)
Model HBY **CHURCHILL** Internal Grinder.
No. 3 **KITCHEN & WADE** Vertical Honer.
27in. **WOTAN** Hydraulic Shaper.
16in. **BLANCHARD** Rotary Surface Grinder.
New 35½in. **ZERBST** Lathe, 10ft. 4in. between centres.
New **LAGUN** 49in. × 12in. Universal Miller, with dividing heads and universal attachment. Power feeds and rapids in all directions. £1,250.

DIMCO (Gt. Britain) LTD.
28, Wood Lane, SHEPHERD'S BUSH, LONDON, W.12.
SHEpherds Bush 4401/2.

ALBERT EDWARDS

(MACHINERY) LTD.,
79/89, PENTONVILLE ROAD, LONDON, N.1
Telephone: TERminus 0167/8/9

HENRY & WRIGHT 25 Ton Dieing Press. Motorised 400/3/50.
SCHULER 10 Ton Inclinable Power Press. M/D 400/3/50.
CRAIG & DONALD Universal Punching and Shearing Machine. Will cut 5in. × 5in. angles.
VAN NORMAN Plain Horizontal Milling Machine. Table 50in. × 12in. Speeds to 1,250 r.p.m. M/D 400/3/50.
EAGLE 36in. × ½in. Overcrank Power Guillotine. Geared. M/D 400/3/50.
BROWN & SHARPE No. 2 Surface Grinding Machine. M/D 400/3/50.

Classified Advertisements (PLANT FOR SALE, contd.)

Cashmores

Selection of Machine Tools from Stock

CENTRE LATHES

New **WILLSON** 7¼in. Mark V S.S. & S.C. Lathe to admit 3ft. 0in. between centres.
MITCHELL OF KEIGHLEY 8¼in. S.S. & S.C. Lathe to admit 4ft. 3in. between centres.
MITCHELL OF KEIGHLEY 10¼in. S.S. & S.C. Lathe to admit 4ft. 0in. between centres.
MITCHELL 7in. S.S. & S.C. All-Geared Head Gap Bed Lathe, to admit 3ft. 0in. between centres.
WILLSON 7¼in. S.S. & S.C. Lathe, to admit 3ft. 0in. between centres.
FAIRBAIRN 13in. S.S. & S.C. Lathe with two saddles, to admit 17ft. between centres.
VOLMAN 8in. S.S. & S.C. Gap Bed Lathe, to admit 4ft. 6in. between centres.

BORING MACHINES

WEBSTER & BENNETT 36in. Vertical Boring Mill, table speeds 5.6/125 r.p.m.
WEBSTER & BENNETT 48in. Vertical Boring Mill, table speeds 4-88 r.p.m.

DRILLING MACHINE

New **KITCHEN-WALKER** 4ft. 6in. Radial Drilling Machine, No. 5 M.T. spindle.

GRINDING MACHINES

JONES & SHIPMAN Fig. 540 Horizontal Spindle Surface Grinding Machine, hydraulic feed 6in. × 18in. capacity.
One similar Machine with vertical spindle.
NORTON 6in. × 18in. Horizontal Spindle Surface Grinding Machine with hydraulic feed.
LUMSDEN Model 90LE Vertical Spindle Rotary Table Surface Grinding Machine, with 24in. diameter magnetic chuck.
NORTON 6in. × 30in. Hydraulic Plain Cylindrical Grinding Machine, maximum wheel diameter 20in.

MILLING MACHINES

VICTORIA M.2 Universal Milling Machine, 40in. × 10in. table.
ARCHDALE 20in. Dial Type Horizontal Milling Machine, 40in. × 12in. table.
GREENWOOD & BATLEY Plain Horizontal Milling Machine, working surface of table 20in. by 10in.
EDGWICK 18in. Horizontal Plain Production Milling Machine, with 40in. × 12in. table.
EDGWICK No. 2 Dial Type Vertical Milling Machine, 46in. × 11in. table.

PLANING MACHINE

SWIFT SUMMERSKILL 8ft. × 4ft. × 4ft. Planing Machine with 4 toolboxes, all electric Lancashire Drive.

POWER HAMMER

MASSEY 5 cwt. Pneumatic Side Type Power Hammer.

SLOTTING MACHINES

BUTLER 14in. stroke All Geared Slotting Machine with 30in. diameter rotary table.
DUTRANNOIT 24in. stroke Precision Slotting Machine with swivelling head, 39½in. table.

SHAPING MACHINES

New **ALBA** 24in. and 18in. stroke Shaping Machines.
BUTLER 18in. Heavy Duty Shaping Machine.

SHEARING MACHINE

New **KEETONA** 8ft. 0in. × ¼in. Undercrank Guillotine Shearing Machine.

STRAIGHTENING ROLLS

BRONX 8ft. 0in. × ¼in. Straightening Rolls 5 roll type.
All the above machines are motorised 400-440/3/50 cycles.

JOHN CASHMORE LTD.
NEWPORT 1, MON.
Tel.: Newport 66941 (6 lines).

Siemens Schuckert Electrically

Heated Furnace, 6ft. 10in. dia., 8ft. 10in. deep, 550 deg. C., 100 kW, 400 volts.
New Process 100 kVA Seam Welder, 400/3/50.
British Federal 50 kVA Flash Butt Welding Machine. 400/3/50.
Fielding Hydraulic Pipe Bender, up to 8in.
200 Ton Fielding Downstroke Hydraulic Press, 14in. ram, 42in. stroke, 63in. daylight.
100 Ton Fielding ditto, 10in. ram, 72in. stroke, 99in. daylight
50 Ton Fielding ditto, 3ft. stroke.
Bliss 70 Ton Geared Double Sided Power Press. 400/3/50 supply.
3 Bliss No. 304 Vertical Single Action Drawing Presses, 7¼in. stroke, 50 tons. American.
Bennie Punching, Shearing and Section Cropping Machine, 4½in. × 4½in. × ½in. angle.
Windsor 6-oz. Plastic Injection Moulding Machine.
Sedgewick Bending and Folding Machine, 6ft. × ½in., motorised.
"Pyramid" Bending Rolls, 9ft. 0in. × ½in.
200 Tons Tangye Hydraulic Straightening Press, bed 25ft. × 3ft., stroke 21in., motorised travelling table, 2 ram pump.
Hugh Smith Double Table Scarfing Machine, 13in. fixed stroke, from 16in. to 8ft. wide, 1½in. thick steel plates.
Crow, Harvey Punch, Shears and Angle Cropper, 18in. blade, 27in. throat, heavy duty.
Pels Punch Shears and Cropper, 12in. blade, shear ½in., takes 6in. × 6in. × ½in. angles.
Robertson Shears, ½in. capacity, 10 h.p., 28in. blade, 9in. maximum opening. (Two.)
Berry Plate Guillotine, capacity 4ft. × 1in., 18in. throat, 30 h.p. motor.
New 1-cwt. and 2-cwt. Hammers by Massey and Alldays & Onions, also 3-5-cwt. secondhand E.O.T. Cranes.
30 Ton Marshall Fleming, 29ft. span, cab control.
25 Ton Clyde, 21ft. 9in. span, cab control 1954. Can convert any span to 95ft.
20 Ton Vaughan 42ft. 3in. span. Unused.
20 Ton Morris Goliath, 35ft. span, 5 ton auxiliary.
10 Ton Heywood, 34ft. span. Unused.
10 Ton Morris, 32ft. 10in. span, cab control.
10 Ton, 60ft. span. 1955. (Two.)
7 Ton, 37ft. span. 1950. (Two.)
5 Ton, 37ft. span. 1944.
3 Ton Morris, 149ft. span. 1954.

FRED WATKINS (ENGINEERING), LTD., Coleford, Glos. 'Phone: Coleford 2271 (5 lines).

Ward No. 7 Combination Turret

Lathe (Chucking). Power feeds to turret and cross slide. Screwing by leader and nut. Also Herbert No. 3 Combination Turret Lathe similar to above.—H. BYWATER, New Spring Street, Birmingham, 18. Cen. 5795.

NEW MACHINES FOR IMMEDIATE DELIVERY

MAS FK08C Automatic Die-Sinking Machine, with horizontal copying spindles and 2-27in. dia. rotary tables.

MAS VRM 50A Portable Universal Radial Drill. Capacity 2in. Arm swivels through 360°.

HDA. 80 Bridge Type Planing Machine. Capacity 10ft. x 31½in. x 29½in.

Please send for full details.

Elgar Machine Tool Co. Ltd.,
172-178 VICTORIA ROAD, ACTON, LONDON, W.3.
Telephone: Acorn 3555 (7 lines)

M. WARD
(Machine Tools) Ltd.
1, KILBURN HIGH ROAD, LONDON, N.W.6

Tel.: Maida Vale 1195/6.
'Grams: Emwarneers, Kilb., London.

LATHES

COLCHESTER "Triumph," 7in. × 48in. Gap S.S. & S.C.
LE BLOND 15RP S. & S., 15in. × 24in.
CARDIFF S.S. & S.C. 8¼in. × 48in. "Senior." 1952 M/c.
CRAVEN 36in. Swing × 12ft. Between S.S. & S.C.
SMART & BROWN 4in. × 18in. S.S. & S.C.
LANG 36in. Surfacing and Boring.
ACME No. 5W Capstan, chuck machine.
RYDERMATIC No. 12 Multi-Tool.
D.S.G. 13Z Minor S.S. & S.C.
WILLSON 6½in. × 36in. Gap Bed S.S. & S.C.

CAPSTANS AND AUTOS

WARD No. 7 Capstan, chucker.
HERBERT 4B D/L chuck and bar feed.
HERBERT 2S air-operated chucker.
TAYLOR No. 1263 Capstan, ¼in. cap.

DRILLS

FOSDICK 4 BM. 3 spin. H/Sp.
CORONA 3M Pillar, 1½in. cap.
KITCHEN & WADE 2ft. 6in. Radial, 2in. capacity.
CORONA Model 9FX Super High Speed Bench.
CORONA Model 12AX Bench, ⅞in. cap.
BRISDON Model 52 Pillar, ¾in. cap.

GRINDERS

KEIGHLEY KN Internal.
GRAND RAPIDS No. 36 Hyd. Hor. Spin. Surface.
HERBERT JUNIOR Surface, 10in. × 6in. × 9in.
BROWN & SHARPE No. 5 Surface.
BROWN & SHARPE No. 23 Plain, cap. 10in. × 48in.
BROWN & SHARPE No. 2 Surface, cap. 6in. × 18in.
SMART & BROWN Internal, 1½in. cap.
BROWN & SHARPE No. 5, 3in. × 18in. Plain.
BALLINGER 10/24 "Versatile" Abrasive Cutting-off Machine.
NEWALL Model L.U. 10in. × 36in. Hyd. Universal.
B.S.A. LANDIS Type C 6in. × 18in. Hyd. Plain.
SNOW Mod. O.S.72 Surface, cap. 15in. × 72in.
CHURCHILL Mod. H.C.B. Internal Auto Size.
HAHN & KOLB Hyd. Disc Lapping M/c.
JACKMAN No. 22 Disc, 18in. dia.
LUMSDEN Mod. 12M. Tool, 14in. × 2 wheel.

MILLERS—Vertical

REED PRENTICE Mod. 3VG, table 38in. × 10½in.
CINCINNATI Model O8 Production.
KENDALL & GENT Duplex Profile, table 18in. × 15in.

MILLERS—Horizontal

CINCINNATI Mod. O8 Plain Automatic.
BROWN & SHARPE No. 000 Plain Auto Miller.
BROWN & SHARPE No. 2 Universal, light type.
RICHMOND 2HS Plain, table 35in. × 9in.
ARCHDALE 20in., table 40in. × 10in.
ASQUITH H.K.1 Duplex Keyway, table 43in. × 10in.
CINCINNATI Mod. O.K. Prod., table 34in. × 12in.
ARCHDALE 14in. Plain, table 27in. × 8in.
ARCHDALE 28in. Plain, table 49in. × 13in.

BORING MACHINE

KEARNS Mod. O.C. Horizontal, 3in. dia. spindle.

SAWING MACHINES

EHJ No. 13 Filing and Sawing.

SHAPERS

TOWN 14in.
HERBERT N.D. 20in.
ORMEROD 14in.

GEAR CUTTER

MAXICUT Gear Shaper, Mod. No. 2.

MISCELLANEOUS

T.T. & H. Javelin Etchers, Multi-heads (3 m/cs.).
HEAP 2in. Screwing Machine.

Classified Advertisements (*PLANT FOR SALE, contd.*)

Newman

AUTOMATICS

BULLARD Multi-Au-Matic 7in. 8 spindle.
BULLARD Multi-Au-Matic 12in. 6 spindle.

BORING MACHINES

KEARNS No. 2 Horizontal Boring and Facing Machine, 3in. dia. travelling spindle.
KEARNS Model OC Horizontal Boring Machine, 3in. dia. travelling spindle.
KEARNS No. 4 Horizontal Boring and Facing Machine, 4in. diameter travelling spindle.
WEBSTER & BENNETT Vertical Boring Machine, table 50in. diameter.
RICHARDS Type PRT Horizontal Floor Boring Machine, 3½in. travelling spindle, 28in. diameter facing head.
GIDDINGS & LEWIS No. 45 Horizontal Boring Machine, 5in. diameter travelling spindle.

CAPSTAN AND CENTRE LATHES

CHURCHILL-REDMAN Model 13NM Heavy-Duty S.S. & S.C. Gap Bed Centre Lathe, 15in. centre height × 72in. between centres. Swing in gap 50in.
MITCHELL Model DM10 S.S. & S.C. Gap Bed Centre Lathe, 10½in. centre height × 7ft. 5in. between centres. (NEW.)
OLDFIELD & SCHOFIELD Surfacing and Boring Lathe, 10½in. centre height.
WARD 7B Combination Turret Lathe.
NILES Heavy Duty Centre Lathe, S.S. & S.C. 17in. centre height × 28ft. between centres.
U.L.R.O. Heavy Duty Centre Lathe, 16in. centre height × 30ft. between centres.

DRILLING MACHINES

HETTNER Radial Drilling Machine, 10ft. elevating arm.

GEAR MACHINES

ORCUTT Model HM24 Hydraulic Interna Gear Grinder.
GLEASON 3in. Straight Bevel Gear Generator

GRINDING MACHINES

CHURCHILL Plain Cylindrical Grinding Machine, 26in. swing × 84in. between centres (1951).
LANDIS Type C Plain Hydraulic Cylindrical Grinding Machine, 6in. swing × 18in. between centres.
LANDIS Plain Hydraulic Cylindrical Grinding Machine, 18in. swing × 72in. between centres.
ORCUTT Model HM24 Internal Spur Gear Grinding Machines.
CHURCHILL Plain Hydraulic Cylindrical Grinding Machine, 20in. swing × 72in. between centres.
BROWN & SHARPE Plain Cylindrical Grinding Machine, 10in. swing × 36in. between centres

MILLING MACHINES

CINCINNATI No. 3 High Speed Dial Type Vertical Milling Machine (1950).
CINCINNATI Model 5/72 Plain Hydromatic Milling Machine, table 91in. × 22in. (1952).
CINCINNATI No. 2L Plain Horizontal Milling Machine, table 52in. × 10in.
CINCINNATI No. 1M Vertical Milling Machine.
CINCINNATI No. 4 Dial Type Horizontal Milling Machine.
GRAFFENSTADEN Model F1101 Plain Horizontal Milling Machine, table 52in. × 10in.
PRATT & WHITNEY Model BL3620 3-spindle "Keller" Die Sinking Machine.
CENTEC Model 3R Automatic Production Milling Machine, table 25in. × 16in.

MISCELLANEOUS

LANGE & GAILEN 28in. stroke Double Headed Hydraulic Shaping Machine.
TAYLOR & CHALLEN Double Sided 50-ton Geared Power Press, 10in. stroke.

NEWMAN INDUSTRIES LIMITED,

Machite Tool Division: YATE, BRISTOL

Tel.: Chipping Sodbury 3311. Telex. 44121. Cables: "Dynamo Yate."

London Office: Terminal House, Grosvenor Gardens, S.W.1. Tel.: Sloane 8206. Telex. 23289.

One Secondhand Scrivener No. 1

Centreless Grinding Machine, maximum capacity 1¼in. diameter with Plunge Feed. Hand Operated. Motorised 400-440/3/50.

C. & G. OLDFIELD, LTD.,
15, Abercorn Street,
PAISLEY.

75-ton Daniels Downstroke Hydraulic Press.

Ram 8in. dia., 12in. stroke. Max. daylight 24in. Platens 17½in. × 14½in. Two 2½in. pushback rams. Motorised pump unit.—LEE & HUNT, LTD., Crocus Street, Nottingham. Tel.: 84246.

FORREST

BENNIE 4ft. by ¼in. Bending Rolls.
BROADBENT Lathe 12½in. by 6ft. 6in.
WILSON Lathe 8in. by 3ft. 0in.
RHODES 6ft. by ¼in. Guillotine.
FACEPLATE Lathe 80in. swing.
RICHARDS No. 1, 2 and 4 Horiz. Borers.
RICHARDS 5ft. Double Column Vert. Borer.

W. FORREST & CO. LTD.,
SYLVESTER GARDENS,
SHEFFIELD, 1.
Telephone: 23314/5

Cincinnati No. 3 Vertical Milling

Machine. Speed Range 18-1,300 r.p.m. Dial Type.

Further details from:—
C. & G. OLDFIELD, LTD.,
15, Abercorn Street,
PAISLEY.

Alba 24in. Shaper. Ormerod

18in. Shaper.—C. DUGARD, LTD. Denmark Villas, Hove 32471

HIGH QUALITY USED MACHINE TOOLS

Used **PRECIMAX** Type UPJ12/72 Hydraulic Universal Cylindrical Grinding Machine with variable speed workhead and electrics to suit 400/3/50.
Used **CINCINNATI** No. 2 Tool and Cutter Grinding Machine. 400/3/50.
HERBERT No. 12 Heavy Duty Combination Turret Lathe. Full chucking equipment. 400/3/50.
TOWN 28in. Vertical Spindle Drilling Machine. Compound table. 400/3/50.
K. & W. 33in. Sensitive Radial Drilling Machine. Swing-aside table, swing-aside arm. 400/3/50.
JONES & SHIPMAN 20in. Vertical Drilling Machine. No. 4 Morse Taper. Power feed. 400/3/50.
KEARNS No. 2 Standard Horizontal Boring Machine with facing head and sliding spindle. 400/3/50.
SNOW T20 Table Surface Grinding Machine.
ARCHDALE 28in. Horizontal Manufacturing Milling Machine, with power and rapid feeds. Table size 49in. × 30in. 400/3/50.
WE UNDERTAKE REBUILDING OF ALL TYPES OF MACHINE TOOLS

CENTAUR TOOL WORKS,
EYRE STREET, SPRING HILL,
BIRMINGHAM, 12.
Tel.: EDGbaston 1118 & 1119 'Grams: Capstan, Birmingham

GATE

MACHINERY CO., LTD.
176/178, Victoria Road, Acton, LONDON, W.3. ACOrn 8881

GRINDERS

JONES & SHIPMAN 540 Surface Grinder.
ROBOT 6in. × 18in. Surface Grinder.
NEWMAN 10in. × 24in. Universal Grinder.
BROWN & SHARPE No. 2 Surface Grinder.
HORTSMAN Thread Grinder, capacity 5in. dia. × 9in. b.c.
BROWN & SHARPE No. 5 Cylindrical Grinder.
FRITZ WERNER Model 270A Cylindrical Grinders, 3½in. × 7in. b.c.
BROWN & SHARPE No. 13 Universal Grinder.
BRYANT No. 5 Heavy Duty Internal Grinder.
BENTLEY Form Cutter Grinder.

LATHES, CAPSTANS

D.S.G. 8½in. × 48in. Gap Bed, 19-418 r.p.m.
D.S.G. 8½in. × 30in., 11-490 r.p.m.
HOLBROOK 8in. × 36in., 11-400 r.p.m.
COLCHESTER MASTER 6½in. × 36in. Ainjest Screwing Attachment.
LE BLOND "Regal" 7in. × 40in., 25-500 r.p.m.
EMPIRE 6½in. × 40in. Lathe.
SOUTHBEND 5in. × 24in. Bench Lathe.
BOYES & EMMS S.S. & S.C. Lathe, centre height 16in. × 7ft. 6in.
ROLLO 6½in. Centre Lathe.
HENDY 13in. × 30in. S.C. Lathe.
RIVET 4in. × 18in. b.c. Precision Lathe.
LE BLOND 14in. × 24in. S.C. Lathe.
WARNER & SWASEY No. 3 Capstan.

MILLERS

CINCINNATI 8in. × 18in. Tool and Die Miller.
EDGWICK No. 2 Universal, 46in. × 11in. table, 24-405 r.p.m. Vertical Attachment Dividing Head.
TRIDENT Vertical, table 30in. × 8in., 75-750 r.p.m.
CINCINNATI 1-18 Production Miller.
KENDALL & GENT Vertical Miller, table 69in. × 10in., speeds 20-300, rapid traverses.
SCHIESS DEFRIES Vertical Keyseater.
MAMMUT 10in. × 23in. Table Horizontal Mill, hand lever operated.
FRITZ WERNER 10in. × 34in. Horizontal Mill.
BROWN & SHARPE No. 2 11in. × 49in. Horizontal Mill, speeds 15-376. Feeds 3/10-15 I.P.M.

PRESSES, SHAPERS, PLANERS AND HOBBERS

BUTLER 14in. Production Slotter.
INVICTA 5m. Shaper.
ORMEROD 8in. Toolroom Slotter.
CHURCHILL-REDMAN 32in. Stroke Heavy Duty Shaper. Excellent condition.
ESSEX No. 32 Punch Shaper.
30-ton **RASKIN** Double Sided Double Geared Drawing Press. Area 20in. × 23in. Draw 4¾in.
New **POREBA** Model HDA.80 Planer, capacity 10ft. × 32in. × 30in. table, drive by Heid gearbox.
DOWDING V8 Gear Hobber.

DRILLS

POLLARD 4-spindle Pedestal Drill, 2-2MT 2-3MT.
POLLARD 3-spindle Pedestal Drill, 3MT, 110-1,455 r.p.m. Power Feed.
POLLARD 13 AX Pedestal Drill.
PROGRESS 4E Pillar Drill.
TAUCO ½in. Bench Drill.
BOLEY Multi Drill VB 10in.
CORONA 13in. 2AP Sensitive Pedestal Drill.
CORONA 20in. Pedestal Drill.
15HEF 4 Spindle Drill.

MISCELLANEOUS

CANNING Double Ended and Centreless Polishing Machines.

Classified Advertisements (*PLANT FOR SALE, contd.*)

K·E·N·T

AUTOMATICS

C.V.A. No. 26. 1960 Machine.
C.V.A. No. 12. 1960 Machine.
C.V.A. No. 8. 1950.
B.S.A. ⅜in.

LATHES

Broadbent 14in. × 7ft., unused.
Sicmatic 14in. × 27in. Hyd. Lathe. 1960.
D.S. & G. 18in. × 12ft. S. & S.
Betts Bridgeford 15in. × 18ft.
Lang 6½in. × 3ft. S.S. & S.C.
Holbrook 6½in. × 4ft. Gap bed.

MILLING MACHINES

Sant Andrea U.F.O.3 Hor.
57in. × 14in., as new.
Archdale 20in. Hor. Rapid.
Reinecker Vert. 52in. × 24in. with built in cir. table, 30in.
Jason Vert. 48in. × 12in. Sw. and Sl.
Herbert 15s Vert. 48in. × 12in.
Adams No. 5 Thread Mill.

CAPSTANS AND TURRETS

Minganti 1a Turret, 2½in. Bar.
Gisholt No. 3 Capstan.
Warner & Swasey No. 3 Capstan.
Ward No. 2a Capstan Lathe.
Herbert 1S Capstan Lathe.
Murad 3Q Capstan Lathe.

MISCELLANEOUS

Churchill NB 18in. × 6in. Surface Grinder
B. & S. No. 2 Surface Grinder.
Excel No. 1 Surface Grinder.
C.V.A. 10 Die Press.
Maiden Bar-ending Machine.
Raboma 4ft. 6in. Radial Drill.
K. & W. 2in. Pillar Drill.
Granor 26in. H.D. Shaper.
Hutto Vert. Honer.
3 Ton Hi-ton Press.
S. Platt 3in. × 14g. Tube Roller.
Edwards 4ft. × ¼in. Power Guillotine.

Many other machines in stock.

All motorised 440/3/50.

K·E·N·T MACHINERY & ENGINEERING CO.

Datchelor Place Mews, London, S.E.5

Telephone: ROD. 4149

Holroyd Rivet Punching Machine for sale. Motorised, toggle action, with power lift to table. Capacity ½in. diameter rivets. Gap, 5in. Table 13½in. × 8in. Electrics for 350-440/3/50.—Photo. etc., from F. J. EDWARDS LIMITED, 359, Euston Road, London, N.W.1, or 41, Water Street, Birmingham, 3.

TRY LIBERTY 6644 FOR YOUR MACHINES

Our stock includes Myford MG12 Grinders, Eagle Surface Grinders, Myford Lathes, Boxford AUD 4½in. Lathes, Willson 6½in. Lathes, Pacera Drilling Machines from ½in. to 1½in. capacity, Startrite Bandsaws, Kennedy, Rapidor and Q. & S. Hacksaw Machines, Centec Milling Machines, 18in. Alba Shapers, Vices and Rotary Tables of all types.

LIBERTY ENGINEERING SUPPLIES LTD.

Colliers Wood High Street, S.W.19

Harry Kirk Eng. Ltd.

can recommend the following modern quality machines from STOCK

AUTOMATIC

RYDER Verticalauto, capacity 16in. swing × 8in., 6 spindles.

BORING MACHINES

RICHARDS 36in. Vertical Boring Mill, complete with side head.

JONES 6in. Spindle Horizontal Borer. Table 17ft. 6in. × 8ft. Spindle travel 48in. Rapid traverse 84in. per min. Motorised 400/3/50. Weight 70 tons.

BULLARD 26in. Vertical Boring Mill.

KITCHEN & WADE Vertical Fine Boring Machine. 14in. stroke. Compound table.

SCHIESS Vertical Boring Mill, 39in. dia. of table. Maximum swing 48in. S.C.M.D. 35 h.p., 400/3/50.

DRILLING MACHINE

ARCHDALE 8-Spindle Hydraulic Vertical Drilling Machine.

GRINDING MACHINES

HEALD No. 172 Gap Bed Internal Grinding Machine, maximum diameter of component 36in.

BILLETER Hydraulic Open-side Slideway Grinding Machine, capacity 47in. × 12in.

LATHES

NOBLE & LUND Heavy Duty Centre Lathe, 22in. centre height × 29ft. between centres Max. swing over saddle 33in. dia.

HARVEY Heavy Duty Centre Lathe, 42½in. centre height × 52ft. between centres. Max. swing over saddles 65in. dia.

MILLING MACHINE

COLLET & ENGLEHARDT Keller Type Die Sinking Machine. Model FKf80, capacity 60in. × 30in.

PLANING MACHINES

CLEVELAND Openside Planing Machine, capacity 10ft. × 2ft. 6in.

CINCINNATI Planing Machine, capacity 8ft. × 2ft. 6in.

MISCELLANEOUS MACHINES

CLIFTON & BAIRD Horizontal Cold Sawing Machine, 30in. dia. Saw. Maximum capacity 22in. × 7in R.S.J.

Hydraulic Vertical Internal Honing Machine (manufactured by **PETER WOLTERS**), Capacity 0.2in. to 2in.

RAPIDAN Double Helical Gear Generating Machine, 12in. diameter capacity.

Further details from

HARRY KIRK ENGINEERING LTD.,

BRANDON ROAD WORKS, BRANDON ROAD, COVENTRY.

'Phone:

WALSGRAVE-ON-SOWE 2253 (6 lines).

AUTOS

CONOMATIC 1¼in. 8 spindle. Type W.W.
WICKMAN 1¼in. 5 spindle. 1941 machine.
WICKMAN 1¼in. 5 spindle. 1941 machine.
WICKMAN 6in. 5 spindle Chucker.

DRILLING

ASQUITH 4ft. 6in. O.D.1 Radial Drill.
ASQUITH 4ft. O.D.1 Radial Drill.
PROGRESS 5E. Round table.

GEAR SHAPING

Model 61 **FELLOWS** Gear Shaper. Straight spur. 35in. dia. × 5in. face width.

LATHES

WARNER & SWASEY No. 2A Long Bed.
SOUTHBEND 16in.
EDGWICK 7in.
DEAN, SMITH & GRACE. Height of centres 7in.
MONARCH 22M S.S. Taper Turning Lathe.
WARD 10 Combination Turret Lathe.

MILLING

20in. **ARCHDALE** Plain Mill. Rapid.
28in. **ARCHDALE** Rapid All Ways.
18in. **EDGWICK** Production Mill.
CINCINNATI No. 5 High Power Plain Hor. 1942 machine.
KENDALL & GENT C.V.M.40.
KENDALL & GENT C.V.M.25 Vertical Mill.

SHAPING GUILLOTINES

EDWARDS 6ft. × ⅛in. Overcrank.
EDWARDS 8ft. × ¼in. Overcrank.

FOLDERS

MORGAN 6ft. × 14g. Universal.
EDWARDS 6ft. × ¼in. Swing beam, hand geared.
EDWARDS 6ft. × 14g. Open ended.
EDWARDS 6ft. × 10g. Open ended.

ELDAIR NEW PRESS BRAKES.
6ft. × 12g. between columns. Delivery 10 weeks.
6ft. × ⅛in. between columns. Delivery 3 weeks.
10ft. × ⅛in. between columns. Delivery 1 week.

All machines motorised 400-440/3/50.

STANCROFT LTD.

BEDWORTH ROAD, COVENTRY

Telephone: Coventry 88072/3.

Rapidmill No. 3 Horizontal Milling Machine.—C. DUGARD, LTD., Denmark Villas, Hove 32471.

Two Cassels Cyanide Furnaces, 15in. × 36in. deep. Cassels T1 Gas Furnace, 48in. × 18in. × 24in., quantity of alumelt tempering salt. What offers—space required.—Tel.: Thornton Heath 5222.

LEONARD ROTH

ABBOT ST., KINGSLAND HIGH ST., DALSTON JUNCTION, LONDON, E.8.

TERMS ARRANGED

Tel.: CLissold 0513/4

BALLINGER Abrasive Cutting Off Machine' 16in. wheel, 400/3/50. £250.
36in. BANDSAW, tilting table, 400/3/50. £162.
HERBERT No. 4 Capstan, steel tray model, 400/3/50. £195.
JONES & SHIPMAN Pillar Drill, No. 4 Morse Taper, 26in. table, power feeds, motorised a.c. £110.
PROGRESS Pillar Drill, No. 3 Morse Taper, 400/3/50. £75.
EDWARDS 48in. × 14 Gauge Power Guillotine, 400/3/50. £250.
EDWARDS 42in. Treadle Guillotine, 18 Gauge. £47 10s. 0d.

PLEASE WRITE FOR LISTS

NORTON FOR NEARLY NEW **MACHINE TOOLS**

Ring **TATE GALLERY 0633/6**

For Complete Stock List.

REVERSE CHARGE CALLS ACCEPTED

A selection of New and Nearly New machines from Stock

AUTOMATICS

Single Spindle
B.S.A. 68¾in. Cap (Choice of two).
BROWN & SHARPE OG. (Choice of two.
BROWN & SHARPE 2G. (Choice of two.)
Multi Spindle
B.S.A. GRIDLEY 6 sp. 1in.
GRIDLEY 6 sp. $\frac{9}{16}$in. (Choice of two.)
B.S.A. GRIDLEY 4 sp. $\frac{7}{8}$in. (Choice of three.)
CONOMATIC 6 sp. 1¼in.
GREENLEE 6 sp. 1⅝in.

CAPSTAN, COMB. TURRET LATHES

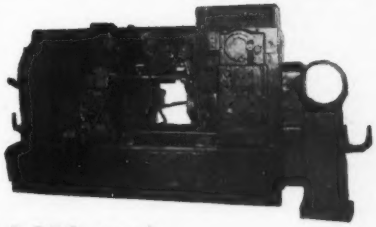
WARD No. 7 Covered bedtype, WTE series and wartime built. (Choice of two.)
GISHOLT No. 5 Chucker, Power Feeds, 39 to 500 r.p.m.
WARD 1A Hand Operated Collet Chuck. Speeds 75 to 4,130 r.p.m.
WARD 10B Comb. Power feed to turret, Ball chuck, Bar feed equipment. Rebuilt.
LIBBY IH5 Comb. Hole in spindle 5¼in. dia. Power and rapid feeds to saddle turret and cross slide.

GRINDERS

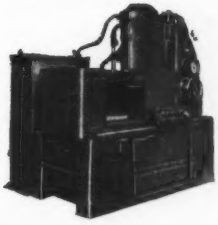
CHURCHILL 12in. by 50in. Hydr. Universal, internal spindle.
JONES & SHIPMAN 8in. by 16in. Universal, internal spindle.
CHURCHILL 20in. by 96in. Hyd. Cylindrical Serial Number 20468. For delivery August.
MYFORD 5in. by 9in. MG9 Cylindrical
CHURCHILL 42in. swing 120in. bore internal
HEALD No. 81 Internal Gagematic Automatic Chuck Grinder. Serial Number 18601.
HEALD Internal Model 81

MILLING MACHINES

MILWAUKEE 3H, Plain table 64in. by 13½in.; 20 to 1,000 r.p.m.
ARCHDALE 20in. Plain, Rapid Production.
CINCINNATI No. 3, Vert. Dial Type, table 62½in. by 15½in.; 18 to 450 r.p.m.
VICTORIA U2, Universal, table 45in. by 11in.; 30 to 1,010 r.p.m. NEW.



£4,950 each
WICKMAN 5 Spindle 1⅜in. Cap. Bar Automatics. (Selection of several.)



£2,750
LUMSDEN 24in. dia. Retractable Rotary Table Surface Grinder Model 90RT. With Chuck.

£1,100
CARDIFF 8¼in. by 48in. S.S. & S.C. Gap Bed; 20 to 970 r.p.m.

W. E. NORTON (MACHINE TOOLS) LIMITED
GROSVENOR GARDENS HOUSE · GROSVENOR GARDENS · LONDON · S·W·1
Telephone: TATe Gallery 0633/4/5/6 *Cables:* Norbros, London

Classified Advertisements (*PLANT FOR SALE, contd.*)

PIDGEN BROS. LIMITED

HELMET ROW, OLD STREET, LONDON, E.C.1

Telephone : CLErkenwell 6481

ALL MACHINES MOTORISED FOR 3 PHASE SUPPLY UNLESS OTHERWISE STATED

AUTOMATICS
POTTER & JOHNSON 4D.
BORERS (Horizontal)
KEARNS No. 2
BROACHING
AMERICAN Model H2, stroke 3pin.
CAPSTANS
HERBERT 2S.
MURAD ¾in.
HERBERT 4B.
DRILLS
DENBIGH 24in. B.G.
HERBERT " C " Power Feed.
CORONA No. 21 AR, No. 3 M.T.
JONES & SHIPMAN 816, ⅞in. cap.
CORONA IAX, No. 1 Morse Taper.
CORONA 15HF, ⅞in. cap.
LELAND GIFFORD 2-sp., No. 2 M.T.
HERBERT Type B. Single Spindle, ½in.
CORONA 6MX Cluster Type.
HERBERT Type H, ¼in. dqp.
CORONA 12AX, ⅝in. cap.
ENGRAVERS
LIENHARD 3 Dimensional (New).
LIENHARD No. 1H.
HUPFIELD Router.
T.T. & H. Type C, C.B. and M.A.
T.T.& H. Multi Etcher.
FILING AND SAWING MACHINES
JONES No. 13 Bandsaw.
Wickstead No. 1 Hacksaw.
RAPIDOR 6in. Hacksaw.
RAPIDOR Filing.
FOLDERS
Sheet Edging, 30in. × 22g.
GEAR CUTTERS
SAFAG Pinion.
MAXICUT 7in. × 2in. × 6 D.P.
PETERMAN No. 1 and 2.
GRINDERS (Surface)
CHURCHILL RBY 24in. ring.
CAPCO No. 2, 14in. × 6in.
CHURCHILL OSB 8in. × 30in.
LUMSDEN Vert. 210 XXM.
SNOW Table, 20in.
ABRASIVE No. 34 Vertical Spindle.
ABRASIVE No. 1½in. hand.
GRINDERS (Internal)
BRYANT 16/38 and 5.
GRINDERS (Cylindrical)
CHURCHILL 6 × 36in. B.Y.
CHURCHILL PBH 12 × 36in. Uni.
NEWALL 6 × 18. Model XL.
PRECIMAX MPB 10 × 48.
GRINDERS (Miscellaneous)
FIRTH BROWN ½-½in. Drill.
JONES & SHIPMAN, 10in. × 27in., T. & C.
J. & S. Drill, ½in. to ¾in.
STEDALL WUNDERLI Carbide.
TAUCO 10in. Abrasive Cut Off.
ROWLAND 12in. × 2in. Single Wheel.
ABWOOD Carbide.
WICKMAN NIVEN Carbide.
WADKIN Saw Sharpener.
JACKMAN D/E 18in. Disc.
EXCEL Model OS, T. & C.
TURNER 14/20, 20in. × 3½in. wheels C/E.
MATRIX No. 10, 8in. × 20in. Plain Thread.
NEWALL 420 Univ. Threads for taps.
HUNT No. 0 and 1 Tap Regrinders.
HUNT No. 0 and 2 Drill.
CHURCHILL Valve.
HONER
DELAPENA 4-speed.
KEYSEATERS
BENTLEY 5in.
ASQUITH H.K.O. Horiz. Duplex.
EDGWICK 4in.
LATHES
DENHAM 4½in. × 24in. S.S. & S.C.
LE BLOND Production, 11in.
RIVET S.S. & S.C. 4in. Model 602.
SOUTHBEND 10in. Toolroom.
WILLSON 7½in. S.S. & S.C.
COLCHESTER TRIUMPH 7in. S.S. & S.C.
SWIFT 12SVS Facing and Boring, 48in.
MONARCH 10EE × 22in. S.S. & S.C.
SMALLPIECE 9SW Multi-tool.
RIVETT 3½in. Plain. Model 715.
WARD, HAGGAS & SMITH 8½in. × 78in.
RYDERMATIC No. 12 Multi Tool.
BERRY 6½in. S.S. & S.C.
MARKING MACHINE
FUNDITOR " Sand Jet."
MISCELLANEOUS MACHINES
LUKE & SPENCER 38in. × 4 HP Polisher.
CANNING 54in. × 2 HP Polisher.
" LINISHER " A4, 36in. × 4in.
MILLERS (Horizontal)
ADCOCK & SHIPLEY No. 0. Table 12×4¼.
CINCINNATI 1/18 Production.
DENBIGH Type C4. Table 46 × 10.
ROSCHER EICHLER. Table 39in. × 12in.
ST. ANDREA Model UFO3. Table 57 × 14.
KENT OWEN 1/8 Production.
HARDINGE Precision. Table 25 × 6½.
WERNER. Table 14 × 5.
JONES 225 Univ. Table 22 × 6.
ARCHDALE 20in. dial. & 14in. mfg.
RICHMOND O3. Table 40 × 10.
U.S. Multi Mill. Production.
MILLERS (Vertical)
C.V.A. 79 Tool and Die.
PALLAS VI. Table 30 × 8½.
REED PRENTICE No. 5, 68in. × 16in. table.
MILNE. Table 30in. × 8in.
WADKIN Type LXIA. Table 36in. × 13in.
PRESSES (Power)
BLISS No. 16 Bar.
LECRA No. 8. 4 tons.
WRIGHT Clicking Press.
SCHULER VZZ. 15 tons d/s gripper feed.
PROFILING MACHINE
CURDNUBE 2 Spindle. Model KIV.
RIVETERS
HIGH SPEED Hammer, 7/16 cap.
TURNER RH18 (¼in.), RH38 (⅜in.), RH34 (¾in.), RH14 and 14/12 (¼in.), RS6 (⅛in.).
SCREWING MACHINE
ATLAS No. 2, 3in.-6in. (Unused).
SHAPERS
INVICTA 10in. and 14in.
NEWEY 14in.
SHEET METAL MACHINES
BESCO 21in. × 1¼in. Rolls.
RHODES 36in. Cramp Folder.
BESCO 48in. Treadle Guillotine.
SLOTTERS
GSP 9½in.
EDGWICK.
TAPPERS
ESSEX No. 24, ¼in. cap.
ACE Horiz., ¼in. capacity.
J. & S. Electrotap, ¼in.
THREAD MILLERS
JONES FB1, 4ft. between centres.
WICKMAN MOULTON 1B.

Reed Prentice No. 5 Vertical Milling Machine. Table 68in. × 16in. 18 Spindle Speeds 17-600 r.p.m. Excellent condition.—Further details from:—

C. & G. OLDFIELD, LTD.,
15, Abercorn Street,
PAISLEY.

TATE

Two CORONA Models 31A
Heavy Duty production drilling machines. No. 5 M.T.
15 h.p. motor drive

These machines were new in 1955 and are in excellent condition.

New Address
TATE MACHINE TOOL CO. LTD.
348-354 KENSINGTON HIGH STREET, LONDON, W.14
WEStern 7031 (5 lines)

SOAG

SHANKS
HOR. & VERT. PLANING MACHINE
—WALL PLANER—

MAIN DATA :—
Horizontal travel ..... **16ft.**
Working height ..... **10ft. 6in.**
Base Plate ..... **16ft. by 8ft.**
H.P. **40**
Drive by Lancashire Dynamo A.C./D.C. gen. set and control cabinet.

Full details from: **SOAG MACHINE TOOLS LTD.,**
7, Juxon Street, Lambeth, London, S.E.11
Phone : RELiance 7201. **'Grams : Sotoolsag, London.**

Heald Rotary Surface Grinder. 13½in. dia. magnetic chuck table. 12in. dia. wheel. With coolant equipment. Motorised.—WILCOX & CO., Barr Street, Birmingham 19. NORthern 1234/5.

Holroyd 2 Spindle Vertical Profile Miller, 400/3/50 motors. Table 18in. × 14in. Speeds to 3,000 r.p.m.—HICKS MACHINERY, LTD., 26, Addison Place, London, W.11. Tel.: PARk 2333.

18in. Stroke Butler All-geared Shaping M/c. 8 speeds 10-120 s.p.m. Table 17in. × 13in. × 14in., 20in. long. traverse. —LEE & HUNT LTD., Crocus Street, Nottingham. 'Phone 84246.

Herbert No. 4BS Capstan Lathe.
Full Turret Equipment, etc.
Further details from:—

C. & G. OLDFIELD, LTD.,
15, Abercorn Street,
PAISLEY.

When answering advertisements kindly mention MACHINERY.

R. O. GRAY

TWO WARD 2A Capstan Lathes. Arranged collet chuck and bar feed.

TWO WARD 3A Capstan Lathes. Both equipped ball chuck and bar feed.

DRUMMOND Model K Capstan Lathe, arranged for chucking. 2 1/16in. Hollow spindle.

ONE **HERBERT** 2B Capstan Lathe, arranged for chucking.

HERBERT 1S Capstan Lathe, part bar feed.

TWO **MOREY** 2G Capstan Lathes, arranged for chucking.

WICKMAN 1¾in. 5-Spindle Bar Automatic, well equipped turret tools, collets, bar feed, and tapping attachment.

HERBERT 1¼in. Single Spindle Bar Automatic, with equipment.

DEAN, SMITH & GRACE, A.N. Type, 7in. by 4ft. between centres S.S. & S.C. Gap Bed Lathe. 2in. H.S. Swing in gap 24¼in. by 7⅛in.

CARSTENS 4½in. by 20in. between centres S.S. & S.C. High Speed Precision Lathe, fully equipped with collets, chucks, etc.

CHURCHILL-CUB 5in. by 20in. between centres S.S. & S.C. Lathe, with chucks, pick-off gears.

KEARNS No. 2 Horizontal Boring and Facing Machine, with Vernier Height Gauge and Boring Bars.

PEARN-RICHARDS No. 2 Horizontal Boring and Facing Machine. With Vernier Height Gauge and Boring Bars.

KEARNS No. O.A. Production type Horizontal Boring Machine with 2in. dia. traversing spindle.

ARCHDALE 5ft. Radial Drilling Machine, No. 5 M.T. Tee slotted low base, approximately 4ft. by 6ft.

KITCHEN & WADE Heavy Duty Pillar Drill. Spindle bored No. 4 M.T. Rise and fall table 24in. dia., swings round column.

ARCHDALE Two-Spindle Relieving Drill, No. 1 M.T. Power feed and independent motor drive to each spindle. Table W.S. 36in. by 15in.

TWO HAHN & KOLB Two-Spindle Drilling Machines. Power feed and independent motor drive to each spindle, fitted ½in. drill chuck. Table W.S. 21½in. by 9in.

DISKUS Vertical Spindle Surface Grinder, hydraulic feeds. Table 53in. by 10in. 14in. dia. segmental wheel.

CHURCHILL Model "O" Universal Tool and Cutter Grinder, capacity 8in. by 16in.

EDGWICK No. 1 Keyseating Machine.

DAVID BROWN Worm Shaft Milling Machine, 4in. centres by 33in. between centres.

BROWN & SHARPE No. 2 Universal Milling Machine. Table W.S. 46in. by 10in. Spindle speeds 30-1,300 r.p.m. With high speed Vertical Milling Attachment, Slotting Attachment, Universal Dividing Head, chuck, change gears, rotary table, etc.

CINCINNATI No. O.8 Vertical Milling Machine. Table W.S. 20in. by 6in. Spindle speeds 150-1,300 r.p.m.

THREE **HERBERT** O.V. Vertical Milling Machines, swivel head. Table W.S. 18in. by 5in. Spindle speeds 250-2,000 r.p.m.

TRIDENT V.O. Swivel Head Vertical Milling Machine. Table W.S. 30in. by 8in. Spindle speeds 130-800 r.p.m.

ARCHDALE 28in. Plain Horizontal Milling Machine. Table W.S. 49in. by 13in. Power feeds and rapid traverse.

EDGWICK 18in. Plain Horizontal Milling Machine. Table W.S. 26in. by 7in. Spindle speeds 30-600 r.p.m.

WOTAN 16in. Crank Shaping Machine.

ALBA 18in. Crank Shaping Machine.

THIEL No. 6 Radial Arm Tapping Machine, capacity ¾in. Whit.

JONES & SHIPMAN "Electrotap", with quantity of leaders.

SUPERIOR Vertical Tapping Machine, capacity ¾in. Whit.

SIX TURNER Spin Rivetting Machines, type R.S.5.

CANNING Centreless Polishing Machine, with motorised dust extractor.

EDWARDS 4ft. by 14g Power Guillotine.

TAYLOR & CHALLEN 10 Ton Inclinable Blanking Press, ½in. stroke.

PFAUTER R.S.1. type Vertical Gear Hobber.

PFAUTER R.S.11 Horizontal Gear Hobber.

All machines self-contained drive. 400/440 volts, 3 phase, 50 cycles.

R. O. Gray.

4/6 MINERVA ROAD, PARK ROYAL, LONDON, N.W.10
Telephone: ELGar 4841/4842

DOUGLAS
OF HIGH WYCOMBE

NEW MACHINE TOOLS FOR IMMEDIATE DELIVERY

DRILLING MACHINES

RICHMOND SR2 4ft. Arm Radial Drill.
RICHMOND HB3/12 4ft. 6in. Arm Radial Drill.
ARBOGA ER1830 2ft. 3in. Arm Radial Drill.
PROGRESS 5E 2in. cap. Drill with compound table and coolant.
ARBOGA E100S 1in. cap. Pillar Drill.
PACERA MF5 1in. cap. Pillar Drill.
PACERA A10 ¾in. cap. Articulated Pillar Drill.
PACERA MB4 ¾in. cap. Bench Drill.
PACERA MFH/RC ¾in. cap. Pedestal Drill.
PROGRESS 2G ¾in. cap. Bench Drill.
PROGRESS 2GS ¾in. cap. Pedestal Drill.
½in. cap. Bench and Pedestal Drills by **PROGRESS, PACERA, FOBCO,** etc.

GRINDING MACHINES

EXCEL No. 1 Pedestal Surface Grinder.
Range of Pedestal Double-ended Grinders—**UNION, MILFORD, R.J.H., VICEROY,** etc.

MILLING MACHINES

CENTEC 2B Plain Horizontal Mill.
VICTORIA UO Universal Mill.
VICTORIA O2 Combined Horiz. and Vert. Mill.
VARNAMO FU2 55in. × 13in. Universal Mill.
MARLOW No. 5DF Vertical Mill.
AUE Hand Lever Plain Mill.

MISCELLANEOUS

B.E.N. VR15 Compressor.
B.E.N. VR32 Compressor.
OPUS 120 Filing and Sawing Machine.
NORTON No. 6A Deep Throat Fly Press.
DENBIGH No. 2 and 3 Fly Presses.
MANCHESTER RAPIDOR 6in. Light and Medium Duty Hacksaws.
WICKSTEED 10in. cap. Hacksaw.
MORGAN 4ft. × 18 s.w.g. Guillotine (treadle)

SECONDHAND MACHINE TOOLS FOR IMMEDIATE DELIVERY

GRINDING MACHINES

REID Surface Grinding Machine, table size 26in. × 6½in., with mag. chuck. £120
LUMSDEN Vert. Spindle Surface Grinder. Type 91LE, 36in. dia. table. £750

GUILLOTINES

BESCO Treadle Operated Guillotine, 6ft. × 18 gauge cap. £90
BESCO Treadle Guillotine, 4ft. × 18 gauge p. £75

MILLING MACHINES

CINCINNATI No. 3 Sliding Head Vert., 63in. × 15in. table. £750
MILWAUKEE No. 2 Horiz., 50in. × 14in. table. £475
PARKSON 2P Horizontal, 52in. × 12in. table. £400

PLANING AND SHAPING MACHINES

BUTLER Planing Machine, 9ft. × 2ft. 6in. table. £1,100

THIS LIST DOES NOT INCLUDE THE MANY NEW MACHINE TOOLS THAT WE HAVE FOR EARLY DELIVERY FROM OUR STOCK ORDERS. PLEASE LET US HAVE YOUR ENQUIRIES.

A. DOUGLAS CO., LTD.,
CRESSEX INDUSTRIAL ESTATE, LINCOLN ROAD, HIGH WYCOMBE BUCKS. Tel.: 4390 (5 lines).

FRYE

WARD 2A Capstan. Bar and Chuck Machine.
LANG 10in. × 60in. S.S. & S.C. Straight Bed Centre Lathe.
Two **STEINEL** Model SH4D Horizontal Milling Machines.
ADCOCK & SHIPLEY No. 3 Horizontal Miller, with vertical attachment.
DENBIGH C4 Plain Miller, with adapted motor drive.
COVENTRY Matrix 21 Thread Grinder.
ASQUITH 3½in. Floor Borer, spindle speeds 5.6-350. Screw cutting 3-12 t.p.i.
CHURCHILL 20in. × 84 Plain Grinder with throw blocks for crankshaft grinding.
PROGRESS 4E Pillar Drill.
TRIDENT 18in. × 6in. Surface Grinder.
SCHUTTE Model WU4 Universal Surface Tool Grinder, 20 × 6 capacity, hydraulic automatic feed to table.
JONES & SHIPMAN 4in. × 10in. Semi Universal Grinder.
RICHMOND MV1 Vertical Miller. Table 30in. × 10in. Speeds to 1,000.
ADCOCK & SHIPLEY 2V Vertical Miller. Table 36in. × 10in. Speeds to 1,500.
PEARN RICHARDS Horizontal Borer, 28in. dia. facing head, rapid traverses and screwcutting.
HILLE 1¼in. Capstan, speeds to 1,200, feeds to turret and cross slide, hob and drag screwcutting.
SMART & BROWN ¾in. Capstan.
150 ton 10ft. ⅄ Press Brake, with Fraser Mono Radial. 30 h.p. pumping unit.
GISHOLT 3L Combination Turret Lathe, 4¾in. hollow spindle. 10 h.p. motor.
WICKMAN MOULTON ATM1 Thread Miller. Max. dia. milled 6in. external, 7½in. internal. Distance work and cutter spindle 24in.
HULLER UG3 Radial Arm Tapper.

FRYE MACHINE TOOL CO. LTD.,
POYLE ROAD, COLNBROOK, BUCKS.
Telephone: Colnbrook 2442.

Kitchen & Wade H3 Horizontal Boring and Drilling Machine complete with Indexing Table.

Further details from:—
C. & G. OLDFIELD, LTD.,
15, Abercorn Street,
PAISLEY.

NEW MACHINES EX STOCK

PERRIN AV2 Jig Borer with Co-ordinate Optics.
VICTORIA U2 Rapidmil.
VICTORIA Juniormil.
INVICTA 24in. Major Shaper.
ALBA 4S Shaper.
MYFORD M.G.12 Grinder.
TOWN Radial, 1¼in. capacity.
PROGRESS 5E Compound.

R. KELLY & SONS LTD.,
LIVERPOOL—ROY 4463.

Kitchen & Wade H.3 Horizontal Boring, Drilling and Milling Machine, with 9ft. 0in. Square Table and Auxiliary Table. New 1956. Excellent condition.

Further details from:—
C. & G. OLDFIELD, LTD.,
15, Abercorn Street,
PAISLEY.

MARTIN
MACHINE TOOLS (MANCHESTER) LTD.

EMPRESS WORKS, EMPRESS STREET CORNBROOK, MANCHESTER, 16
Members of B.A.M.T.M.
Tel.: Trafford Park 1091-2

USED MACHINES IN STOCK AVAILABLE FOR IMMEDIATE DELIVERY

RICHARDS 5ft. Vertical Borer.
RICHARDS HB2 Horizontal Borer.
POLLARD 3 Spindle No. 3 MT. Drill.
WARD 7 Capstan Lathe.
HERBERT No. 4 Capstan Lathe.
CHURCHILL No. 0 6in. × 18in. Universal Grinder.
HUNT No. 3 Twist Drill Grinder.
CHURCHILL REDMAN 13 NM × 7ft. 6in. S.S. Lathe.
WARD HAGGIS SMITH 24in. Surfacing and Boring Lathe.
ARCHDALE 28in. Manufacturing Miller.
RACCINE 6in. Hacksaw.

GUARANTEED REBUILDS

We will rebuild your own machine tools back to makers' specification with 6 months' guarantee. We shall be pleased to quote by return.

NEW MACHINE TOOLS IN STOCK OR ON SHORT DELIVERY

H.M.V. Horizontal Borer, Type AV75, 3in. Travel spindle.
FOBCO ½in. Bench Drill.
GRIMSTON 6in. and 8in. Double Ended Grinder.
UNION Tool and Cutter Grinder.
HARRISON 8in. × 36in. S.S. & S.C. Lathe.
WORCESTER 6 ton Crank Press.
PILOT 12 ton Hydraulic Press.
INVICTA 6M Shaper, 24in.

MACHINE TOOLS AVAILABLE FOR SALE BUT NOT IN STOCK

PEGARD Kneeless Type Vertical Miller, 36in. under spindle, table travel approx. 4ft.
BUFFALO 28U Double Ended Punch, Shear and Angle Cropper.
ASQUITH 6ft. Radial Drill with screw cutting attachment.
ORCUTT 24in. Automatic Gear Grinder. New 1957.
VICTORIA U O Universal Miller.

MACHINES MOTORISED 400/3/50 UNLESS OTHERWISE STATED

The above list is only a selection of the many New, Used and Rebuilt tools available, please call or write for our priced brochure.

Essex No. 32 Punch Shaper, Adjustable stroke 52, 36 and 65 strokes per min. Swivel of tool adjustment 0-90 deg. Dividing Head. In "as new" condition.—BOX C935, MACHINERY, Clifton House, Euston Road, N.W.1.

Kitchen & Wade H.5 Horizontal Boring and Drilling Machine, complete with Square Box Table and Auxiliary Revolving Table. Machine equal to new.

Further details from:—
C. & G. OLDFIELD, LTD.,
15, Abercorn Street,
PAISLEY.

RING BELLS for machine tools

LEEDS 63-7398

WILLSON 7½in. Gap-bed S.S. & S.C. Lathes. Admits 36in. between centres and 26in. in gap. 9 speeds 26–477 r.p.m. M.D. 400/3/50.
GISHOLT No. 4 Bar Feed Capstan. Swing over hardened strip bed 18½in.; over cross slide 9¾in. Spindle bore 2 7/16in.; collet cap. 2in. 12 speeds 28–730 r.p.m. M.D. 400/3/50.
JONES & SHIPMAN Slot Hydromil. Built 1951. Will cut two keyways together up to 12in. by 1in. M.D. 420/3/50.
JONES & SHIPMAN Fig. 138 Universal Precision Grinder. Cap. 27in. by 10in. Swivelling and elevating wheelhead. With internal spindle, etc. M.D. 400/3/50.
NORTON Type C 10in. by 48in. Hydraulic Plain Grinder. Admits 20in. wheel. Filmatic bearings. M.D. 400/3/50.
POLLARD Type 15HF High Speed Horizontal Drill. Cap. 1 1/16in. Swing over bed 15in. dia. Admits 12in. between chuck and loose head. M.D. 400/3/50.

PFAUTER R1 Gear Hobber. Table dia. 19½in. Admits 16in. dia. work with arbor support. M.D. 400/3/50.

PRECIMAX U.P.J. Universal Grinder. Cap. 12in. by 60in. Hydraulic. M.D. 400/3/50.

MAGEE No. 10 Wiring and Edging Machine. Capacities (max.) 14's gauge sheet and ¼in. wire or 16's gauge sheet and 7/16in. wire. (Min.) 24's gauge sheet and 10's gauge wire. M.D. 400/3/50.

BLISS Model L 306 Double Sided, Double Geared Power Press. Tonnage rating 135. 10in. stroke. Daylight 20in. Bed area 26in. by 26in. M.D. 400/3/50.

WICKMAN Grinding and Lapping Machine. Model 14C. Takes one grinding wheel 14in. by 2in. and one lapping wheel 14in. by 2in. M.D. 400/3/50.

HERBERT No. 9 Combination Turret Lathes.
TAYLOR & CHALLEN 40-ton Double Sided Press. Stroke 1¼in. With strip feed and scrap shear. M.D. 400–440/3/50.
KEIGHLEY 12in. by 24in. Universal Grinder with internal attachment. Built 1951. M.D. 400/3/50.
BLISS No. 19 Inclinable Power Presses. Tonnage rating 15. Stroke 2in. M.D. 400/3/50.
BRADLEY & BURCH 36in. Treadle Guillotine.
CINCINNATI 3/36 Hydromatic Miller. Speeds 8–200 r.p.m. Table size 52½in. by 14in. Single cycle.
BROWN & SHARPE No. 2 Light Type Plain Miller. Table 45in. by 10in. Power all ways. Speeds 14–1300 r.p.m. M.D. 400/3/50.

H. BELL (Machine Tools) LTD., Walter Street, LEEDS 4.

SOAG

HIGH QUALITY GEAR CUTTING MACHINES IN STOCK

GEAR PLANERS AND SHAPERS

SYKES No. 5B Gear Generator for int. and external spur, helical and double helical gears, max. dia. 61in.; max. face width 18/10in.; max. D.P. 2/1¼.

SYKES No. 3C Horizontal Gear Generator for internal and external spur, helical and double helical gears, max. dia. 40in., max face width 10in., max. pitch 2½/3.

RAPIDAN Heavy Duty Gear Generator, Size No. 4 extended. Motor drive. For internal and external spur gears. Capacity: internal gears 68in. dia., external gears 56in. dia. Face width 1in.-6in. max. Max. D.P. 2.

SUNDERLAND No. 16 Gear Planer for spur and spiral gears, motor drive, fully equipped and ready for work, capacity 32in. dia. × 6in. face × 3 D.P.

FELLOWS Gear Shaper, Type 645 A 3, for ext. and int. spur and helical gears. Max. ext. and int. pitch dia. 18in.; max. face width ext. and int. 3in.; max. diametral pitch, spur, 3/4; max. diametrial pitch, helical, 5/7; max. helical angle 30in.; work spindle 5½in.; working height max./min. 8½/4in.

GEAR HOBBERS

90in. **MUIR** Gear Hobber. Type MT. 9 for spur, spiral, helical and worm gears. Capacity: for spur and worm gears max. dia. 90in. At high speeds 72in. For spiral gears at 10 deg. 90 in., at 45 deg. 70in. Max. face width 30/26in. Max. D.P. 1¼. Dia. table 58in. Hob speeds from 18 to 80 r.p.m. H.p. main motor 12.

Inspection cordially invited.

SEND US YOUR ENQUIRIES.

SOAG MACHINE TOOLS, LTD.,
JUXON STREET, LAMBETH, LONDON, S.E.11.
'Phone: RELiance 7201.
'Grams: "Sotoolsag, London, S.E.11."

No. 47 V Herbert M/d Kneeless type Vertical Milling M/c. Table 72in. × 17in. Long trav. 48in. Cross trav. 16in. 24 feeds ¾in.-60in. per min. Rapid traverse. 16 speeds 43-1,525 r.p.m. 15 h.p. 2-sp. motor, 400/3/50.—LEE & HUNT LTD., Crocus Street, Nottingham. Tel.: 84246.

Brown & Ward Single Spindle Automatic. ¾in. capacity. 4 operation. £575.—'Phone Duncan 0962.

Rhodes 40-ton Inclinable Press, geared, 2in. stroke, 400/3/50, tiebars. Ex. Cond. Also Edwards 28-ton column press, adj. stroke and table. Ex. Cond.—C. L. THOMAS LTD., Stirling Road, Solihull. Tel.: 3075-6.

NEW MACHINE TOOLS FROM STOCK

GRANOR OF HALIFAX 28in. stroke Heavy Duty Shaping Machine. 400-440/3/50.

EARLY DELIVERY

MITCHELL OF KEIGHLEY 8¼in. Type DMS Gap Bed Lathe, by 5ft. 3in. B.C. 400-440/3/50. Instant delivery.
MITCHELL OF KEIGHLEY 10¼in. Type DM10 Gap Bed Lathe by 5ft. 5in. B.C. 400-440/3/50. Instant delivery.
MITCHELL OF KEIGHLEY 12¼in. Type DM12 Gap Bed Lathe by 6ft. 6in. B.C. 400-440/3/50. April delivery.
VICTORIA No. 2 Rapidmil Universal Milling Machine. Table size 48in. × 11¼in. 400-440/3/50. Instant delivery.
VICTORIA No. V2 Vertical Milling Machine. Table size 45in. × 11in. 400-440/3/50. Instant delivery.

CENTAUR TOOL WORKS,
EYRE STREET, SPRING HILL,
BIRMINGHAM, 18
Tel.: EDGbaston 1118 & 1119. 'Grams: Capstan, Birmingham

Corona Heavy Duty Vertical Drilling machine. No. 5 Morse Taper Excellent condition.
Further details from:—
C. & G. OLDFIELD, LTD.,
15. Albemarle Street,
PAISLEY.

Cam or Profile Copy Milling Machines for diameters up to 20in. or areas up to 18in. × 22in. Also Rotary End Profile Miller. All 400/3/50.—HICKS MACHINERY, LTD., 26, Addison Place, London, W.11. Tel.: PARk 2333.

Brown & Sharpe OOG Single- spindle Automatic for sale, series 15,000. Also C.V.A. No. 8 ditto. Electrics 400/3/50.—BOX C876, MACHINERY, Clifton House, Euston Road, N.W.1.

Hey Duplex Automatic Splining and Milling Machine.—C. DUGARD, LTD., Denmark Villas, Hove 32471.

Milwaukee 2 HL V/Mill, £750 Victoria V/3 V/Mill, £1,250 C.V.A. 1A Toolroom Lathe, £1,250. Churchill Redman 9in. × 5ft. Toolroom Lathe, £350. All machines can be seen running. Early release. Ring FOOts Cray 4311 for appointment at E.M.E. LTD., Powerscroft Road, Cray Road, Sidcup, Kent.

Brown and Ward 1¼ Automatic, 4-op with threading spindle, 400/3/50 electrics, bar feed, gears, cams, toolholders, etc. Ex. Cond.—C. L. THOMAS LTD., Stirling Road, Solihull. Tel.: 3075-6.

---

1 5/8in. Acme Gridley 6-spindle Automatic. Rebuilt. Can be seen working. £1,750.—'Phone Duncan 0962.

Butters Bros. Derrick Crane 3 tons capacity, 90ft. 0in. jib, cabin type. All electric and in excellent condition.
Further details from:—
C. & G. OLDFIELD, LTD.,
15, Abercorn Street,
PAISLEY.

WIDDOWSONS

SIX—"RICHMOND" MODEL 01 UNIVERSAL MILLING MACHINES

Table 30¾in. by 8in. 16in. LONGITUDINAL TRAVERSE, EACH COMPLETE WITH VERTICAL ATTACHMENT, DIVIDING HEAD, ELECTRICS, and other useful equipment in metal tool cabinet.

ALL REBUILT. IMMEDIATE DELIVERY.

SIX—"MITCHELL" 8½in. CENTRES GAP BED S.S. and S.C. LATHES

54in. BETWEEN CENTRES. ALL IN VERY GOOD CONDITION AND EXCEPTIONALLY WELL EQUIPPED.

Also a number of other Lathes 7in., 7½in. and 8in. Centres.

HERBERT WIDDOWSON & SONS LIMITED

Canal Street Works, Nottingham · Telephone: 51891 (4 lines)

MEMBER OF B.A.M.T.M.

Kearns No. 1 Horizontal Boring and Facing Machine, complete with Rear Stay. A.C. Motor.
Further details from:—
C. & G. OLDFIELD, LTD.,
15, Abercorn Street,
PAISLEY.

We have just issued our latest list of American machine tools lying in our American Showrooms.

Send for your copy now.

K & C MACHINERY LTD.,
Stephen St.,
COVENTRY.
Tel: 23669.

Landis 10in. × 24in. Type "C" Universal Grinder. Internal Attachment. New condition.
Further details from:—
C. & G. OLDFIELD, LTD.,
15, Abercorn Street,
PAISLEY.

C.V.A. Autos. No. 8, 3rd Slide Slotting Bar Feed, little used (3).
HERBERT 4 Senior Capstan, well equipped.
HERBERT 4 Capstan, 750 r.p.m., well equipped.
HERBERT 4 Capstan, 511 r.p.m., steel trade, well equipped.
WARD 2A Capstan.
MYFORD SUPER 7 Lathe, as new.
SNOW P., 24 × 8in. Hydraulic Surface Grinder.
NEWALL 10 × 24 Hydraulic Plain Cylindrical Grinder, built 1957 but only used for 6 months.
ARCHDALE Manufacturing type Horizontal Milling Machine, built 1951, automatic traverses.
CINCINNATI O8 Vertical Milling Machine.
CINCINNATI O8 Horizontal Milling Machine.
HERBERT No. 33 Horizontal Milling Machine, 36 × 9 working surface.
ASQUITH OD 2 8ft. Radial Drilling Machine, speeds to 830 r.p.m., No. 5 M.T.
CLEVELAND 130 Gear Hobbers (2).
ATLANTIC Jig Borer, equivalent to Newall No. 1 machine; only 2 years old, very little used.
NOBLE & LUND 20/22 Hydraulic Fluifeed, cold saw.

STAINES MACHINE TOOL CO., LTD.,
THE CAUSEWAY, STAINES.
Telephone: Staines 52647.

TATE

Virtually New British Built
KEARNEY & TRECKER
MILWAUKEE Horizontal Milling Machines at prices much lower than cost.

MODEL 2CE Table Size 52in. × 12in. table travel 28in., spindle speeds (16) 25-1300 r.p.m.

MODEL 3CE Table Size 67in. × 15in., table travel 34in. spindle speeds (16) 25-1300 r.p.m.

These machines are available immediately from our London showrooms and are in immaculate condition, indistinguishable from new.

New Address
TATE MACHINE TOOL CO. LTD.
348-354 KENSINGTON HIGH STREET, LONDON, W.14
WEStern 7031 (5 lines)

Lang 6½in. × 30in. S.S. & S.C. Lathe—speeds 37-908.—C. DUGARD, LTD., Denmark Villas, Hove 32471.

When answering advertisements kindly mention MACHINERY.

ROLLS TOOLS LIMITED

OF WOKING SURREY
HAVE MACHINE TOOLS AND EQUIPMENT FOR SALE INCLUDING THE FOLLOWING:-

AUTOMATICS

C.V.A.8 Single Spindle.

B.M.W.13 13mm. S.S.

OOG BROWN & SHARPE S.S.

PITTLER 12mm. Swiss type.

MULTI SPINDLE AUTOMATICS

⅞in. **B.S.A. ACME GRIDLEY** RA6 spindle. Screwing spindle, Collets and Tooling. 3 available. 1944–1948.

1in. **NEW BRITAIN GRIDLEY** 6-spindle, Model 60. 3 available.

1¼in. **CONOMATIC** 8-spindle with screwing spindle, thread rolling, tooling and collets.

1½in. **CONOMATIC** 4-spindle.

2½in. **WICKMAN** 5-spindle, very well equipped, practically new.

LATHES

SWIFT SENTINEL, Model 10SP. A.G.H/. SS & SC. 10in. centres by 5ft. 6in. between. Speeds 30 to 1,000.

CHURCHILL-REDMAN A.G.H./SS & SC. 9in. centres by 6ft. between.

DEAN SMITH & GRACE A.G.H./SS & SC.

PRATT & WHITNEY A.G.H.

EDGWICK A.G.H./SS & SC. 6½in. centres by 30in. between.

TRIDENT Gap Bed Lathe.

MILLING MACHINES

CINCINNATI, No. 2 Dial Type. Medium speed horizontal.

CINCINNATI 08 Vertical.

C.V.A., Model 79, Vertical Mill.

THIEL, Model 58 Tool Room Mill.

GRINDERS—THREAD

NEWALL, Model No. 1.

WICKMAN HORSTMAN, Model No. 1 and No. 2.

SHAPERS

ESSEX Punch Shaper Microscope and equipment.

ROCKFORD 28in. Hydraulic Universal.

INVICTA 6M 24in.

ALBA 4S 18in.

SLOTTERS

BUTLER RAPID 8in.

BUTLER PRECISION 4in.

CAPSTAN AND TURRET LATHES

WARD No. 7 Capstan.

WARD No. 7 Combination. Serial K. & L.

WARD OE. Capstan ¼in. Bar.

HERBERT No. 9 Combination.

HERBERT No. 4.

HERBERT No. 2S & 1S.

HERBERT No. 0.

GISHOLT 1L A.G.H. Combination.

GISHOLT No. 4 A.G.H. Capstan.

GISHOLT No. 3 A.G.H. Capstan.

GISHOLT No. 3 Simplified Capstan.

MODERN No. 1.

WARNER & SWASEY No. 1.

RADIAL DRILLS

KITCHEN & WADE, 40in. Arm. Power Rise and Fall. Speeds 1,500 r.p.m., No. 3 Morse. Suds.

ASQUITH 6-ft. D.C. Variable Speed. Motor Drive.

ARCHDALE Light Sensitive 36in. Rise and Fall Table. No. 3 Morse.

GRINDERS—SURFACE

SNOW VB.18, 84in. Traverse by 15in. wide.

SNOW P.24, 24in. by 8in. Hydraulic.

DOALL 24in. by 8in. Hydraulic Feed.

DRILLS

ARCHDALE Snout Type Electrically Controlled Vertical Borer. 50 Int. Taper.

ARCHDALE Column Drill. No. 3 Morse. Power feed to spindle.

CORONA 12AX 2-spindle Drill.

PRESSES

60-ton **LECRA,** Model 60ND.

60-ton **TAYLOR & CHALLEN** B.3½. Variable stop up to 4in., with Roll Feed and Chopper.

BLISS No. 8 Power Press.

FLY PRESSES, Nos. 5 & 6.

GRINDERS—UNIVERSAL

JONES & SHIPMAN 12in. by 36in.

LANDIS 12in. by 36in.

NORTON 12in. by 36in.

CHURCHILL 10in. by 24in.

GRINDERS—CYLINDRICAL

PRECIMAX HUP.1, 7in. by 10in.

PRECIMAX HUP.1½, 7in. by 10in.

PRECIMAX MPO., 6in. by 24in.

CARL UNGER 12in. by 36in.

NORTON 10in. by 24in.

GRINDERS—INTERNAL

CHURCHILL, Models HBA, HBB, HBC and HBY.

HEALD, Models 70 and 81.

RIVETT, Model 121.

JUNG, 3in. capacity.

SMART & BROWN 3in. capacity.

All Electrics 400/3/50

ROLLS TOOLS LTD. No. 1 Factory, Pyrford Road, Pyrford, Woking

Contact Mr. P. W. Gander Telephone: Byfleet 43252/3 & 41456

Classified Advertisements (*PLANT FOR SALE, contd.*)

HELIOT

35 GREENWICH CHURCH ST. LONDON. S.E.10 GRE.1222

CAPSTAN LATHES

WARD No. 7 Chucking, covered bed.

TURRET LATHES

WARD No. 16, covered bed, 8¼in. spindle, 32in. 4-jaw chuck, rapid and power feeds to saddle, cross slide and turret, power rotating turret, spindle speeds 7-225 r.p.m., 50 h.p. motor.

WARD No. 8, covered bed.

WARD No. 10B, covered bed. 4¼in. spindle power rotating turret, power and rapid feeds to turret only, collet head and bar feed.

DRILLING MACHINES

ASQUITH O.D.1 5ft. Radial, with loose box table.

AVEY 2-spindle drill, pedestal base, ½in. capacity.

HORIZONTAL MILLERS

SUNSTRAND No. 2 Electro Mill, auto. cycle, 12in. by 54in. table.

HERBERT No. 3ND. Plain.

EDGWICK No. 2, 11in. by 42in. table, No. 40 steep taper.

JONES & SHIPMAN duplex slot miller. Hydraulic feed.

VERTICAL MILLERS

WADKIN high speed for light alloy, 16in. by 40in. table.

GRINDING MACHINES

B.S.A.-Landis, 6in. by 18in. plain hydraulic cylindrical grinder.

BROWN & SHARPE No. 2 Surface Grinder, 18in. by 6in.

TAPPING MACHINES

HERBERT No. 2 Flash Tapper, ½in. capacity.

All machines motorised 400/3/50 unless otherwise stated.

Atlas No. 1 High Speed Capstan Lathe, 1in. capacity, 400/3/50 Collet Chuck, Bar feed, etc.—HICKS MACHINERY, LTD., 26, Addison Place, London, W.11. Tel.: PARk 2333.

Bryant No. 24-36 Hydraulic Internal Grinder complete with Hydraulic Wheel Dressing device, Spindle, etc.

Further details from:—
C. & G. OLDFIELD, LTD.
15, Abercorn Street,
PAISLEY

MIDLAND

BORING MACHINES

WEBSTER & BENNETT 4ft. D Type Vertical Borer. Speeds 5 to 109 r.p.m.

BANDSAWS

THIEL No. 17 Metal Bandsaw. 12in. Throat. Table 20in. × 20in.

CROPPING MACHINES

Double Ended Angle Cropping Machine. Cap. up to 6in. × ½in. angles.

DRILLING MACHINES

POLLARD 13in. Pillar Drill, No. 2 Morse Taper. R. & F. Table 11in. × 11in.

ARCHDALE 28in. H/Duty Pillar Drill, No. 4 Morse Taper. R. & F. Table Elc. Suds.

GRINDING MACHINES

New **NORTON** 10in., 12in., 14in., 16in. and 20in. D/E. Tool Grinders.

ABRASIVE No. 34 24in. × 8in. Vertical Spindle Surface Grinder.

HAMMERS

MASSEY 5 cwt. Slide Type Pneumatic Hammer. 400/3/50.

MILLING MACHINES

VAN NORMAN No. 26 Horizontal and Vertical Milling Machine. Slotting head.

MILWAUKEE 3.H Vertical Milling Machine.

PRESSES

TAYLOR & CHALLEN "370" 20 Ton O/F Press.

TAYLOR & CHALLEN "845" Dial Feed Notching Press.

BRADLEY & TURTON No 3 Flypress.

SWEENEY & BLOCKSIDGE Bench Press. Cap. 3 tons.

SCREWING MACHINES

KENDALL & GENT 3in. Screwing Machine. Leadscrew Type.

POLISHING MACHINES

3 and 5 h.p. Double Ended Polishing Spindles.

SLOTTING MACHINES

ORMEROD 12in. Stroke Slotting Machine. 27in. Rotary Table.

All machines 400/3/50 electrics unless otherwise stated.

THE
MIDLAND MACHINE TOOL CO.
BRADLEY, BILSTON, STAFFS.
Tel.: Bilston 42471/9.

F.J. Edwards Ltd

GRINDING MACHINES

EXCEL 24in. × 8in. Hydraulic Surface Grinder.
SMART & BROWN 1½in. cap. Internal Grinder.
BRYANT 16-38A Hydraulic Internal Grinder.
CHURCHILL Model HBB automatic sizing traverse feed type internal Grinding Machine with spindles for combined hole and face grinding, max. swing 19in.
PRATT & WHITNEY 36in.×12in. Vertical Spindle Surface Grinder.
JACKMAN No. 28, 53in. Disc Grinder.
HUNT No. 3 Twist Drill Grinder, 3in. cap.
HUNT No. 1 Twist Drill Grinder, ½in. cap.
BANDFACERS 43in. × 6in., and 36in. × 4in. (New.)

MILLING MACHINES

CINCINNATI 0-8 Vertical Miller, 20in. × 6in.; 150-1,300 r.p.m.
ADCOCK & SHIPLEY No. 2 VP Vertical Production Milling Machine, table 30in. × 10in., capacity 22in. × 8in. × 18in., speed 750-1,500 r.p.m.
REED PRENTICE No. 2 V.G. Vertical Miller; table 20in. × 9in.; capacity 16in. × 11in. × 15in.
ARCHDALE 12in. light type high speed Vertical Milling Machine, table 17in. × 10in., 12in traverse, speed 235-1,500 r.p.m.
B.C.A. Precision Vertical Milling, Boring and Drilling Machine, 8in. dia. table.
HERBERT 46V Vertical Milling Machine; capacity 36in. × 13½in. × 22½in.; table 58in. × 15in.; power rapid all ways.
CURD NUBE 2-spindle Vertical Profile Miller; table 17¼in. × 14¼in.
MILWAUKEE 2K Universal Miller; table 56in. × 12in.; capacity 28in. × 10in. × 17in.; 15-1,500 r.p.m.
CINCINNATI No. 2 dial type Universal Miller, table 49in. × 12in.; capacity 28in. × 10in. × 18in.; 500 r.p.m.
VICTORIA U.1 Universal Miller, table 40in. × 11in., capacity 25in. × 8in. × 16in., speeds 31 to 1,010.
VICTORIA U.1 Universal Miller, table 40in. × 11in.; capacity 25in. × 8in. × 16in., speeds 31 to 1,010; with vertical milling attachment.
VICTORIA U. 2 Universal Milling Machine, table 45in. × 11in. with vertical milling attachment, slotting attachment and rotary table.
PROGRESS Universal Milling Machine, table 40in. × 10in., capacity 24in. × 9in. × 18in.
PEDERSEN Horizontal Miller; table 49in. × 10in.; capacity 24in. × 7½in. × 16in.
ADCOCK & SHIPLEY 1AD Horizontal Milling Machine; table 19in. × 7in.; capacity 10in. × 6in. × 10in.; speeds 50-2,500 r.p.m.
HERBERT No. 1 Horizontal Milling Machine; table 26in. × 8¼in.; capacity 10in. × 3¼in. × 7in.; speed 100-530 r.p.m.
MILWAUKEE 4K Horizontal Milling Machine, table 82in. × 18in., capacity 42in. × 14in. × 20in., power rapid traverses, speeds 13 to 1,300 r.p.m.
HOLROYD 12in. × 54in. Thread Milling Machine; 7in. spindle bore.
HOLROYD Thread Milling Machine, 6in. dia. capacity for internal and external work.
HOLROYD No. 2A Thread Milling Machine; capacity 4in. × 30in.
BECKER Automatic Milling Machine; table 23in. × 12in.; with auto cycle to table and spindle.
KENT-OWENS 1-14 Production Miller; table 32in. × 9in.; hydraulic feed and rapid traverses.
KENT-OWENS 1-8 Hydraulic Production Miller; table 25in. × 9in.; 100-1,335 r.p.m.
EDGWICK No. 2 Plain Miller. Table 46in. × 11in.; capacity 25in. × 7½in. × 17in. Speed 24 to 405 r.p.m.

PLANING MACHINES

BUTLER 3ft. Openside Planer with side head.
REDMAN 12ft. × 3ft. 6in. × 3ft. Planer, two toolboxes.

359-361, EUSTON RD., LONDON, N.W.1
Telephone: EUSTON 5000. Telex No. 24264.

And at Lansdowne House, 41, Water St., Birmingham, 3. *Telephone: Central 7606-8*

Classified Advertisements (*PLANT FOR SALE ,contd.*

Modern Machine Tools Ltd

QUALITY USED MACHINE TOOLS IN STOCK

LATHES

WILLSON 7¼in. Newell Mk. V S.S. and S.C. Lathe. Swing in Gap 26in. Distance between centres 38in. Speeds (9) 39-716 r.p.m. Spindle bore 2in. Well equipped.
SWIFT 9in. S.S. and S.C. Lathe. Swing in Gap 32in. Distance between centres 54in. Speeds (12) 14-500 r.p.m. Spindle bore 2½in. 4-way Tool Post. 16in. 4-Jaw Chuck.
HERBERT No. 7. Cross Sliding Turret Lathe. Spindle bore 2in. dia. Speeds (8) 30-511 r.p.m.

DRILLS

ASQUITH O.D.I. 6ft. Radial Drill. No. 5 M.T. Spindle. Speeds (12) 31-830 r.p.m. Loose Box Table. Suds.
POLLARD Two-Spindle Pillar Drill. No. 2 M.T. Spindles, hand feed. Speeds (4) 445-1,455 r.p.m.

MILLERS

Reconditioned **CINCINNATI** No. 4 Horizontal Miller. Dial type. Speeds (21) 18-1,300 r.p.m. 16 feeds. Table size 86½in. by 16in. Power feeds in all directions.
MILWAUKEE Model I.H. Plain Horizontal Miller. Speeds (16) 35-1,400 r.p.m. Feeds 16. Table size 40in. by 9in. Rapid traverse in all directions.

NEW MACHINES IN STOCK OR FOR EARLY DELIVERY

MYFORD MG.12 Grinders.
PACERA ¼in., ⅜in., ½in. and 1in. Drilling Machines.
VICTORIA 02 Omnimils, U2 and U2R Milling Machines.
ARNO MILLERS
BEAVER MILLERS.
ELLIOTT 7½in. Lathes.
HARRISON 8in. and **BOXFORD** Lathes.
MITCHELL 8½in. and 12½in. Lathes.
COLCHESTER, CHIPMASTER, STUDENT & TRIUMPH LATHES.
SMART & BROWN 'A', '1024' Lathes, Toggle Presses and Screwing Machines.
TOWN A.E.4 and A.E.5 3ft. 6in. and 4ft. 6in. Radial Drills.

COMPREHENSIVE STOCK LIST AVAILABLE ON REQUEST

P.O. BOX No. 56 GOSFORD STREET COVENTRY Telephone: COVENTRY 22132-6 Cables: MODERN COVENTRY

MMT/SM 6320/9

Asquith O.D.1 4ft. Radial Drilling Machine.

Further details from:—
C. & G. OLDFIELD, LTD.,
15, Abercorn Street,
PAISLEY.

Herbert Carbicut Lathe, 16 spindle speeds 445 to 3,025 r.p.m. 3 feed changes 70, 105, 140. 1½in. dia. spindle bore. 5 h.p. motor. 400-440/3/50.—BOX C910, MACHINERY, Clifton House, Euston Road, N.W.1.

BLANCHARD 24in. dia. Rotary Table Surface Grinding Machine. Vertical spindle.
"MATRIX" Model 10B Universal Thread Grinding Machine. Full set of equipment.
BUTLER 36in. Open Side Planing Machine. Table 48in. × 23in., with side box.
BLISS 4½ Double Action Power Press, 5in. punch stroke, 27in. between columns, with roll feed
WEBSTER & BENNETT 36in. Vertical Boring and Turning Machine. Table 31in. dia. Pentagon turret.
LANG 15in. S.S. & S.C. Gap Bed Lathe, geared head. 60in. between centres.
ORCUTT Internal Gear Grinding Machine. 15in. stroke, Indexing head. (New condition.)
GISHOLT Model 2L Combination Turret Lathe. Speeds 12 to 333 r.p.m. Hollow spindle 4½in. dia.
PENSOTTI 14in. Swivel Head Slotting Machine. 24in. dia. Rotary table, Vernier calibrations.
SCRIVENER No. 2 Centreless Grinding Machine. 6in. width of wheel.
HERBERT Model OV Swivel Head Vertical Milling Machine. Speeds 250 to 2,000 r.p.m. Table 18in. × 5in. W.S.
TAYLOR & CHALLEN Model G.D.P. 3½ Double Action Press. 10in. punch stroke, 22in. between columns.

PARKES (MACHINE TOOLS) LTD.,
WITTON ROAD, BIRMINGHAM, 6.
Tel.: EASt 1742.

Semi-Automatic Thread Milling Machine by Hanson Whitney. Capacity 4in. dia. × 9in. long. Collet capacity 2in. External cap. 4in. dia. max. with 2in. cutter. Internal cap. ¾in. dia. min. with ½in. cutter. Some equipment available.—BOX C931, MACHINERY, Clifton House, Euston Road, N.W.1.

Huller UG3 Tapping Machine, 1955. 400/3/50.—BOX C902, MACHINERY, Clifton House, Euston Road, N.W.1.

HIGH QUALITY USED MACHINE TOOLS

ARCHDALE 20in. Milling Machine, table size 40in. × 10in., power and rapid traverses to table, reversing spindle, backlash eliminator. 400/3/50.
COVMAC 13in. Swing Gap Bed Lathe, by 6ft. 3in. b.c. 400/3/50.
DENHAM 6in. Gap Bed Lathe by 2ft. 3in. b.c. 400/3/50.
BARDONS & OLIVER No. 3 Universal Turret Lathe. 400/3/50.
WARNER & SWASEY 1A Turret Lathe. 400/3/50.
KELLY 28in. Stroke Heavy Duty Shaping Machine with swivelling table. 400/3/50.
RUSSELL Saw Sharpening Machine, max. capacity 42in. diameter. 400/3/50.
ORMEROD 12in. Slotting Machine. 400/3/50

WE UNDERTAKE REBUILDING OF ALL TYPES OF MACHINE TOOLS

CENTAUR TOOL WORKS,
EYRE STREET, SPRING HILL,
BIRMINGHAM, 18
Tel. EDGbaston 1118 & 1119. 'Grams: Capstan, Birmingham.

Pedersen Plain, Miller, All-geared, 400/3/50, power feeds all ways, switchgear. Ex. Cond. Also Adcock & Shipley 1AD, auto-cycle production mill. Ex. Cond.—C. L. THOMAS LTD., Stirling Road, Solihull. Tel.: 3075-6.

Chas. Taylor ¼in. Capstan Bar Feed, Collets, Suds, 3 phase, 1960 machine, as new, £425.—STANCROFT LTD., 72 Dudley Road, Wolverhampton. 'Phone 25661.

Delapena Induction Heating Units. With Generators. 2 and 6 kVA. For hardening, brazing, etc.—WILCOX & CO., Barr Street, Birmingham 19. NORthern 1234/5.

Richards No. 2 PRT Horizontal Boring and Facing Machine complete Live Spindle.

Further details from:—
C. & G. OLDFIELD LTD.,
15, Abercorn Street,
PAISLEY.

10in. × 24in. Churchill Model PAH Hydraulic Universal Tool and Cutter Grinding Machine with rise and fall wheelhead. Fully m/d 400/3/50. Variable hydraulic motion 6in.-180in. per minute.—LEE & HUNT, LTD., Crocus Street, Nottingham. Tel.: 84246.

Classified Advertisements (*PLANT FOR SALE, contd.*)

Cincinnati No. 2 M.H. Plain Horizontal Milling Machine, W.S.O.T. 7in. × 44in.

Further details from:—
C. & G. OLDFIELD, LTD.,
15, Abercorn Street,
PAISLEY.

BROADBENT 6ft. 0in. Double Standard Vertical Boring and Turning Mill, max. height admitted cross rail 46in., max. dia. admitted 77in., speeds to table (12) 1.6-40 r.p.m., feeds (6) 6-144 c.p.i.
MITCHELL OF KEIGHLEY Model NM 14 14½in. centres on 14ft. 0in. gap bed S.S. & S.C. Lathe, complete with standard equipment, admits 7ft. 9in. between centres, swing in gap 52in. × 17in., dia. of hollow spindle 4½in., 8 speeds 8-250 r.p.m.
MITCHELL OF HALIFAX 8½in. centres Gap Bed S.S. & S.C. Lathe, to admit 6ft. 6in. between centres, swing in gap 29½in. × 9½in., dia. of hollow spindle 2½in., 9 speeds 26-500 r.p.m.
VICTORIA Model U.2 Universal Milling Machine, table size 45in. × 11¼in., power traverses; 12 speeds 31-1,010 r.p.m.
DENBIGH Model DVSR4 Variable Speed Horizontal Milling Machine, table size 46in. × 10in., automatic longt. feed 36½in., 9 speeds 25-720 r.p.m.
DENBIGH Model D.4. Horizontal Milling Machine, table size overall 46in. × 10in., auto. longt. feed 37½in., 9 speeds 19-720 r.p.m.
PACERA Model MF5/Mk.2 1in. cap. Round Column Drilling Machine, 18in. swing, spindle bored No. 3 M.T., 8 speeds 80-1,500 r.p.m.
PROGRESS Model 3A Pillar Drilling Machine 1¼in. cap., spindle bored No. 3 M.T., 5 speeds 110-1,780 r.p.m., feed 0.004in./rev.
PACERA Model A.10 Articulated Radial Type Drilling Machine, ¾in. cap., spindle bored No. 2 M.T., 10 speeds 80-4,000 r.p.m., depth of throat 24in., working surface of table 24in. square.
TAYLOR-HOBSON Model D Pantograph Engraving Machine, size of table 15in. × 8in.
MAIDEN Model 4C/ST Threading Machine mounted on cabinet base, cap. 4in. pipes, 2in. bolts.
HEAP type U 3in. Pedestal Universal Screwing Machine, cam type radial die head, cap. ¾in.-3in. B.S.P., ¾in.-1¼in. W Bolts.
All machines fitted with electrical equipment for 400-440/3/50 cycles supply.

THOS. W. WARD LTD.
ALBION WORKS · SHEFFIELD

'Phone: 26311. Ext. 347.

Remember - WARDS might have it!

Jones & Shipman ½in. Column drill £15; Denbigh No. 3 M.T. Pillar £85; Herbert No. 2 Pillar £15; Landis Universal Grinder, 10in. × 30in. £55; Capco Surface Grinder £65; Shapers, Alba 10in. £45; 14in. £125; 18in. £105; Harrison 4½in. Lathe £105; Colchester 8½in. £85; German 7in. Toolroom Lathe £55; Myford 3½in. £20; Warner & Swasey 1in. Capstan £75.—BARRATTS PARK, Heathfield, Sussex. Heathfield 2828.

6in. RPA 8 Spindle Gridley Chucking Auto complete with Chucks, Cams, Tool Slide Holders, etc. Fully motorised. Excellent condition.

Further details from:—
C. & G. OLDFIELD, LTD.,
15, Abercorn Street,
PAISLEY.

- BETTER TRY 600 FIRST !

KENDALL & GENT Model A.V.M. Open Side Plano *MILLING MACHINE*. Table size 78in. × 30in. Longitudinal traverse 72in. Max. distance spindle to table 34in. 27 spindle speeds 26 to 1,390 r.p.m. Motor drive 400/3/50.
Price: £4,100

CINCINNATI Model 4-36 Hydromatic *MILLING MACHINE*. Table size 18in. × 67in. 8 spindle speeds 20 to 150 r.p.m. through pick-off gears. 36in. hydraulic table traverse. Vertical adjustment of head 7in. Max. adjustment of quill 6in. Motor drive 415/3/50. Price: £1,500

CARTER & WRIGHT Dual Feed No. 3 Keyseating and Slot *DRILLING MACHINE*. Tee slotted table 32in. × 12in. Max. length of keyway cut 24in. Max. width of keyway cut 1¼in. 8 spindle speeds 160 to 650 r.p.m. Motor drive 400/3/50.
Price: £675

HERBERT No. 9 Combination Turret Lathe. 20in. swing over bed × 54in. spindle to turret. Spindle bored 4¼in. dia. 16 spindle speeds 14 to 400 r.p.m. Power feed to saddle and turret. Motor drive 400/3/50. Price: £575

ALBA Model 6S Crank *SHAPING MACHINE*. Max. length of stroke 24in. 6 ram speeds. Variable feeds to table. Working surface of box table 23in. × 13in. top face, 13½in. × 14in. side face. Motor drive 400/3/50. Price: £325

HERBERT Model 2D *CAPSTAN LATHE*. Spindle speeds 50 to 2,550 r.p.m. With collet chuck and bar feed mechanism. Motor drive 400-440/3/50. Price: £580

WALKER TURNER 30in. Light Type Radial *DRILLING MACHINE*, with swivelling head. ¼in. capacity. 8 spindle speeds. Working surface of table 18in. × 26in. Max. distance spindle to column 30in. Motor drive 400/3/50. Price: £160

KEARNS Model No. 2 Horizontal *BORING, FACING AND MILLING MACHINE*. 3in. dia. traversing spindle. 20in. dia. facing head. Spindle speeds 66 to 290 r.p.m. Main table 7ft. × 3ft. Auxiliary table 4ft. × 4ft. Machine has extended cross traverse to table with outrigger supports. Motor drive 400/3/50. Price: £3,050

DAVID DOWLING Model 848 Bench Type *ENGRAVING MACHINE*. Pantograph reduction 2 : 1 to 4 : 1. Table 10in. × 14in. Motor drive 230/1/50. Price: £40

KEIGHLEY Type KL Plain Cylindrical *GRINDING MACHINE*. 6in. × 18in. between centres. Variable hydraulic table traverse. Motor drive 400/3/50.
Price: £250

GEORGE COHEN
SONS & COMPANY LTD

SUNBEAM ROAD, London, N.W.10
Tel.: Elgar 7222/7.

STANNINGLEY, NEAR LEEDS
Tel.: Pudsey 2241.

Edwards

NEW MODEL BU.100 Universal Double Ended Punching, Shearing, Section Cropping and Notching Machine. All-steel construction. Motorised for 400/3/50 supply. Shears plates up to ⅜in. Flat bars up to 1in. × 6in., Rounds up to 2¼in., square bars up to 2in. × 2in. Punches up to 1¼in. diameter through ⅜in. Square notches plate up to ⅜in. thick Weight approx. 89 cwt.
RUSHWORTH Power Operated Double Geared Open Ended Guillotine Shearing Machine. Motorised for 230/1/50 supply. Capacity 4ft. × ¼in. With automatic sheet hold-down and adjustable front, back and side gauges. Weight approx. 50 cwt.
HAZELWOOD & DENT 12½in. Spinning Lathe, Motorised for 400-440/3/50 supply. Standard speeds of spindle 1,000, 750, 500 r.p.m. With compound handwheel operated rest with roller head and trimming head. Between centres 2ft. 6in. Weight approx. 12½ cwt.
BESCO 42in. Gap Universal Nibbler Shearing Machine. Motorised for 380-420/3/50 supply Cutter head rotates full 360 deg. With circle cutting device. Max. capacity mild steel ¼in. Depth of throat 42in. Cuts rings or discs up to 42in. diameter. Weight approx. 35 cwt.
TWO NEW **LEN** 40/250 Open Fronted Inclinable Power Presses. With adjustable stroke. Motorised for 400-440/3/50 supply. Pressure exerted 40 tons. Depth of throat 9½in. Adjustment of stroke ¼in. to 3⅜in. Table 18¼in. × 25⅞in. Hole in table 8¼in. diameter. Weight approx. 58 cwt.
TWO NEW **LEN** 25/220 High Speed Open Fronted Inclinable Power Presses. With adjustable stroke. Motorised for 400-440/3/50 supply. Pressure exerted 25 tons. Depth of throat 8⅜in. Table 16¼in. × 22⅛in. Hole in table 8¼in. Stroke adjustable from ¼in. to 3⅜in. Weight approx. 35 cwt.
FROST Power Geared Swing Beam High-Lift Universal Folding Machine. Motorised for 400-440/3/50 supply. Capacity 10ft. × ⅛in. mild steel. Adjustable for sharp and round bends. Clamping beam swings out for removal of trunk sections. With adjustable back gauge. Weight approx. 6 tons.

Photographs of the above are available.

VERY FAVOURABLE HIRE OR HIRE PURCHASE TERMS CAN BE OBTAINED

MACHINE TOOLS, NEW AND USED. Of Every Description. Attractive Prices.

F. J. EDWARDS LTD.,
359-361, EUSTON RD., LONDON, N.W.1
Telephone: EUSTON 5000. Telex 24264.
And at Lansdowne House, 41, Water St., Birmingham, 3. *Telephone: Central 7606-8*

Several 7 kVA Sciaky Spot Welding machines.—BOX C629, MACHINERY, Clifton House, Euston Road, N.W.1.

SOAG
OFFER
For Immediate Delivery
FRICTION SCREW PRESS

GREENWOOD & BATLEY 440 tons, dia. of screw 10¾in., distance between uprights 27½in., max. height ram/table 26in., h.p. motor 20.

For further details write to:—
SOAG MACHINE TOOLS LTD.,
7, JUXON STREET, LAMBETH,
LONDON, S.E.11.
'Phone: RELiance 7201.
'Grams: "Sotoolsag, London, S.E.11."

NEW MACHINE TOOLS

IN STOCK

HORIZONTAL BORERS

UNION BFT. 100/111 4in. dia. Spindle, 4½–630 r.p.m.

JIG BORERS

MANEX optical measuring, built-in Jig Grinding.

MANEX optical measuring. Capacity 12in. by 24in. by 25½in., 70–2,500 r.p.m.

LINLEY Direct reading. Capacity 17½in. by 7in. by 11½in., 275–4,250 r.p.m.

MILLING MACHINES—VERTICAL

SAJO VF. 54. Table 52in. by 11in., 30–1,500 r.p.m. Power and rapids all ways, 7·5 h.p.

INDUMA A.V.I.S. Turret Miller. Table 42in. by 9in., 80–2,713 r.p.m.

VICTORIA T.V.2 Turret Miller. Table 36in. by 10½in., 80–2,700 r.p.m.

SAIMP F.V.O. Table 10in. by 44in., 110–2,720 r.p.m.

GIEWONT FAY 41 Vertical Table 79in. by 16in., 21 spindle speeds 18-1300.

GIEWONT FYC 25 Vertical Table 44½in. by 10½in., 16 spindle speeds 65-1800.

MILLING MACHINES—UNIVERSAL

VICTORIA U.2 Rapidmil. Table 48 in. by 11⅝in., 30–1,050 r.p.m. Power and rapids all ways.

SAJO UF.54. Table 52in. by 11in., 39–1,500 r.p.m. Power and rapids all ways.

SAJO 52. With vertical head. Table 41½in. by 9½in., 40–1,800 r.p.m.

INDUMA 2U. Table 52in. by 10⅝in., 25–1,500 r.p.m. Power and rapids all ways.

INDUMA 3U. Table 60in. by 12½in., 25–1,500 r.p.m. Power and rapids all ways.

MAS FU.2A. Table 52in. by 11¾in., 30–1,000 r.p.m. Power and rapids all ways.

SHAPING MACHINES

INVICTA MAJOR, 24in. stroke—Standard.

INVICTA MAJOR, 24in. stroke—with swivel table.

INVICTA MAJOR, 30in. stroke—Standard.

INVICTA MAJOR, 30in. stroke—with swivel table.

INVICTA 4M. 18in. stroke.

ALBA 2S. 14in. stroke.

ALBA 4S. 18in. stroke.

LATHES

CARDIFF PREFECT. 9½in. by 48in. b.c., 20–1,000 r.p.m.

RAGLAN. 5in. by 24in. b.c. Quick change gearbox.

MAS SV.18R. 7½in. by 40in. b.c., 40–2,800 r.p.m.

SMART & BROWN 1024 10in. by 24in. b.c. 940-2800 r.p.m.

RADIAL DRILLERS

RICHMOND HB3/12. 4ft. 6in., with box table, 2in. capacity, 40–1,800 r.p.m.

TOWN A.E.1 4ft. 6in., with box table, 2½in. capacity, 40–800 r.p.m.

GRINDING MACHINES—UNIVERSAL

RIBON R.U.R.500. 11in. swing by 20in. b.c.

RIBON R.U.R.800. 11in. swing by 32in. b.c.

RIBON R.U.R.1000. 11in. swing by 40in. b.c.

All with internal grinding, coolant, Steadies, etc.

DRILLING MACHINES—PEDESTAL

PROGRESS 4-Spindle (2–½in. cap., 2–⅞in cap.) on common table.

PROGRESS 3A. 1½in. cap.

PROGRESS 2G. ⅞in. cap.

GRIMSTON AEC.48. 1½in. cap. Power feeds.

BANDSAWS

STARTRITE SABRE.

MARCO Horizontal Bandsaw, 8in. by 10in. cap.

ALL MOTORISED—400/440/3/50 CYCLES

P.M.T. (MACHINE TOOLS) LTD

OOZELLS STREET · BIRMINGHAM · 1

TELEPHONE: MIDLAND 9221/2 *BRANCHES: LONDON & BRISTOL*

Classified Advertisements (*PLANT FOR SALE, contd.*)

RING BELLS for machine tools
LEEDS 63-7398

Brown & Sharpe OOG ¼in. Cap. Auto Screw Machine, Serial No. 14537. Complete Bar Feed and Turret Equipment, etc.
Further details from:—
C. & G. OLDFIELD, LTD.,
15, Abercorn Street,
PAISLEY.

EDWIN MILLEN & SONS LTD.
70, CLERKENWELL ROAD,
LONDON, E.C.1.
Tel.: CLE. 6064 & 3602.

DRILLING AND TAPPING

CORONA 4ft. Radial Drill. £325.
HERBERT 1 sp. Drill on three-spindle base. £165.
HAGO H.G.25 High Efficiency, ½in. cap. £250.

GRINDERS

JONES & SHIPMAN 10in. × 27in. Universal Grinder.
PALLAS No. 2 Surface, 18in. × 6in.
HERBERT HUNT Twist Drill Grinder. £65.
HERBERT HUNT Tap and Reamer. £65.
SCRIVENER No. 1 Centreless, with auto. feed.
SMART & BROWN Internal Grinder, 1½in. Max.
NORTON 18in. × 7in. Hyd. Cyl. Grinder. £395.

LATHES

DARLING & SELLERS 10½in. × 12ft. T/T.
STANLEY 7in. × 36in., full Equip.
HASSE & WREDE 10in. × 42in.
WARD 2A B/CK and B/FD collets.
HERBERT 2as Tooling and Collets.
OLDFIELD & SCHOFIELD 15in. × 60in. £650.
HERBERT SMALLPEICE, 6in. × 24in. Multi-tool.
RIVET Instrument Lathe, 4½in. × 24in.

MILLERS (Vert. and Horiz.)

RICHMOND O.1 Horizontal 30in. × 8in.
CENTEC No. 3R Auto-cycle, pro mill.
HEY Duplex Spline Mill. £175.
ADCOCK & SHIPLEY IVM Vert. 25in. × 7in. As new.

POWER PRESSES AND SHEET METAL MACHINES

TAYLOR & CHALLEN 12 ton, roll feed.
SEDGWICK 12ft. × ⅛in. Folder.
BESCO 10 ton Power Press. £175.
E.M.G. 9-ton Airdraulic. £200.
KENNEDY 2in. Tube Bender. £85.

MISCELLANEOUS

MIDSAW 36in. Bandsaw.
BARBER & COLMAN 15in. Hobber.
THIEL Filing and Sawing Machine. £95.
HURTH Key Seating Machine. £225.
THIEL Punch Shaper.
ORMEROD 12in. Shaper with Cam Cutting Attach.
AEROGRAPH Twin Cylinder comp. 100 p.s.i.
MATHEY Jig Borer with clocks. As new.
RAPIDOR 15in. × 15in. Filing and Sawing. £165.
PFAUTER 000 Gear Hobber, with gears. £150.

Other machines in stock.

WE BUY | **WE SELL**
EXCHANGES WELCOME | **HIRE PURCHASE ARRANGED**

American Toolworks Centre Lathe, 19in. Swing, 30in. between Centres. Spindle speeds 17-600 r.p.m. Excellent condition.
Further details from:—
C. & G. OLDFIELD, LTD.,
15, Abercorn Street,
PAISLEY.

15in. Centre "Dean, Smith & Grace" Type 4/9D m/d. all-gd. S.S. & S.C. Lathe with taper turning attachment. 11ft. box end gap bed. 5ft. 6in. b.c. 48in. dia. in gap. 5 h.p. 415/3/50 motor. 16 spindle speeds 9-180 r.p.m. Spindle bored 3⅛in. dia.—LEE & HUNT, LTD., Crocus Street, Nottingham. 'Phone 84246.

Horizontal Disc Lapping Machine, Newall Model 10 V. Excellent condition. £150.—BOX D3, MACHINERY, Clifton House, Euston Road, N.W.1.

Archdale Snout Borer, Modern machine. Spindle dia. 5in. Table area 65in. × 19in. 7.5 h.p. Spindle nose 50 Int. taper. Rapid power approx. to work. Auto change-over to feed and run. Fast return electrically controlled.—BOX C770, MACHINERY, Clifton House, Euston Road, N.W.1.

12½in. Centre Swift Heavy-duty m/d. all-gd. hollow-spindle S.S. & S.C. Lathe with two saddles each with taper turning attachments. 20 h.p. 400/3/50 motor. 18 spindle speeds 1.5-94 r.p.m. Spindle mounted in Timken roller bearings.—LEE & HUNT, LTD., Crocus Street, Nottingham. 'Phone 84246.

Town Type AEO Radial Drill, 42in. arm, No. 3 M.T. elevating swing away table, low base, saddle mounted motor, 400/3/50, with reversing switchgear. Ex. Cond.—C. L. THOMAS LTD., Stirling Road, Solihull 3075-6.

Automatics. Wickman 10 mm. with four tool slides, high speed screwing attach., gears, bar stands, etc. Good condition. Seen London area.—Telephone: Prospect 8237 or write BOX C980, MACHINERY, Clifton House, Euston Road, N.W.1.

NOBLE & LUND 11in./16in. Fluidfeed Cold Sawing Machine with fluid grip vice. Capacity 5in. dia. rounds, 4½in. squares. 3 speeds. 5 h.p. 400/3/50.
HULLER No. 2 Bench Model Tapping Machine. ¼in. capacity. Finest pitch cut 60. Spindle speeds 500-1,000-2,000 r.p.m. 400/3/50.
TAYLOR & CHALLEN 4½ G.D.P. Power Press. Punch stroke 15in. Maximum draw 7½in. Largest blank 18in. dia. Distance between uprights 24in. Complete with die cushion and operators' guards. 400/3/50.
TAYLOR & CHALLEN 3½ G.D.P. Power Press. Punch stroke 10in. Maximum draw 5in. Largest blank 14in. dia. Distance between uprights 22in. 400/3/50
MILWAUKEE 1H Plain Horizontal Milling Machine. Table working surface 40in. × 9in. Rapid traverse all ways. 16 spindle speeds 35 to 1,400 r.p.m. 400/3/50.
RUSHWORTH Geared, Overcrank, Power Guillotine, capacity 10ft. × ¼in. m.s. 20 Strokes per minute. Motorised 15 h.p., 400/3/50. Complete with automatic hold-down, front and rear gauges, fully guarded and spare pair of blades.
BROOKES Overcrank, Double Geared. Power Guillotine, capacity 4ft. × ¼in. Powered worktable (in two sections), 24ft. long approx. × 4ft. wide. Motorised 20 h.p. 400/3/50.
RHODES No. 12 Double Sided, Double Crank, Geared, Power Press. Pressure 75 tons. Fitted Fixed Stroke 4in. Bed area 44in. × 42in. Motorised 400/3/50.

STANCROFT LTD.,
LANCASTER STREET, BIRMINGHAM, 4
ASTon Cross 2235.

• • ELECTRICS • •
(VARIOUS)

Electric Motors—Hundreds in stock. Half maker's prices. Send us your enquiries. Rewinding our speciality—day and night. 40 years' experience. Motors loaned free.—SUGDENS, Glenny Road, Barking. Rippleway 3302.

Four **BRITISH ELECTRIC** Transformers. 11,000 volts input. 230/110 output. Originally linked up to give 440/230 and 110 output. Amps—397/375 output and 12.4 input. First-class condition having just been taken out of use.

PARKES (MACHINE TOOLS) LTD.
WITTON ROAD, BIRMINGHAM, 6
Tel.: EASt 1742.

Electric Motors, New and Secondhand, over 1,000 always available for sale, part exchange or hire. Prompt repairing service in event of breakdown.—JOHN RODWELL, LTD., Vicarage Road, Hornchurch, Hornchurch 4887 (3 lines).

MISCELLANEOUS FOR SALE

POLISTOR FOR POLYTHENE

Heavy duty polythene sheeting for industrial and agricultural uses in the following sizes:

Size	300 gauge Heavy	500 gauge Extra Heavy	12in. Diamond Mesh Sisal Nets
8 x 6 yds.	51/-	84/-	12/6
8 x 8	66/6	110/6	15/-
8 x 10	82/6	138/-	17/6
8 x 12	98/6	164/-	20/-
8 x 16	129/6	219/-	25/-

m mediate despatch per passenger train carriage paid to your address.

POLISTOR LIMITED
Dept. 6, Midhurst, Sussex
Telephone: Midhurst 481

Cannings Plating Generator Set for sale. Input 400-440/3/50, Output 750 amps, 0 to 10 V. D.C. Complete with control panel, meters, circuit breaker, etc. In really excellent condition. Accept low price to clear. —BOX D1, MACHINERY, Clifton House, Euston Road, N.W.1.

Induction Heaters, for Brazing, heat treatment, etc., 1 kW rating. £150.—NU-GUN TELETUBES, LTD., 3, The Mews, Ducket Road, London, N.4. MOU. 2903.

SURPLUS STOCKS
NEW H.S.S. Taper Shank Twist Drills up to 2¼". Also special TAPS and Reamers at keen prices.
WM. HURLOCK JNR. LTD. (Estab. 1904)
5-7 Kingston Hill, Kingston-on-Thames Surrey. KIN 4526-7-8

SITUATIONS VACANT

If you do not wish your reply to any Box No. advertisement in this section to be forwarded to certain firms, please advise us. Your reply will then be destroyed, but you will not be notified as this would disclose the identity of the advertiser.

Automatics Expert Required for sale and service of Continental precision machine tools from London. Experience with tooling design and layout for Swiss-type autos essential. Must have personality to advise clients. Interesting, well-paid post for someone who likes mixture of inside and outside work.—BOX C957, MACHINERY, Clifton House, Euston Road, N.W.1.

Highly Paid, Secure and Interesting posts are always available for technically trained men. Find out how you can put some letters after your name by preparing at home on "No Pass—No Fee" terms. A.M.I.Mech.E., A.M.I.Prod.E., A.M.S.E., City and Guilds, etc. Full details of exams. and hundreds of courses in all branches of Engineering, Draughtsmanship, Management and Automation Techniques, the benefits of our Employment Dept., and unique record of 95 per cent. successes are given in "Engineering Opportunities"—a valuable 148-page Guide which will reveal many chances you are now missing.—Write for your copy today (stating subject of interest).—FREE and without obligation. B.I.E.T. (Dept. 43a), 29, Wright's Lane, London, W.8.

Manager For Small Engineering Company, S.W.4. Capstan and allied work. 12 employees. Free hand from estimating to production. Profit sharing. Financial interest if required but not essential. State experience, age and salary required.—BOX C960, MACHINERY, Clifton House, Euston Road, N.W.1.

DUNDALK ENGINEERING WORKS LTD.

Dundalk, Ireland

require the services of a young

PLANNING ENGINEER

to work on the introduction of a planning system, under the guidance of consultants. The subsequent implementation of the system will be his responsibility.

A salary of £1,000 per annum will be paid, and applicants should write to the Secretary, giving full details of age, qualifications and experience.

ENGLISH ELECTRIC — CONTROL ENGINEERING

ELECTRICAL ENGINEERS

who have an engineering background in the machine tool industry are required to join the expanding Sales organisation of the Control Gear Division as Technical Sales Engineers. Applicants should be of Grad.I.E.E. standard and be conversant with A.C. and D.C. machine characteristics and associated control techniques, as applied to machine tools. They will be based at Kidsgrove Works and be expected in due course to assist Branch Sales Engineers in putting forward specialised schemes to the Company's customers anywhere in the U.K. while Works' activities include the preparation of tenders for such control schemes and drives.

This Division of the Company is utilising the latest light current techniques in the control of variables and constant speed drives and the application of contactless switching devices to industrial control schemes. These posts offer an excellent opportunity to gain experience in these new fields, and provide an interesting and progressive career in Sales Engineering.

Applications should be sent: **Mr. G. M. Smith, Dept. G.P.S., English Electric House, Strand, London, W.C.2,** quoting reference number M397B.

HAMPSHIRE EDUCATION COMMITTEE
FARNBOROUGH TECHNICAL COLLEGE

Assistant laboratory technicians are required for the maintenance of machinery and the preparation of apparatus in the teaching laboratories.
Candidates should possess a scientific background, or have served an appropriate apprenticeship. Salary £10 13s. 5d. per week or £13 3s. 5d. per week according to qualifications and experience.
Applications giving age, experience and qualifications should be sent to the Principal, Farnborough Technical College, Boundary Road, Farnborough, Hants, immediately.

WORKS MANAGER

Required for small group of Light Engineering Companies in their Yorkshire Factory employing 120.

The Factory is producing Mechanical Handling Equipment and a full range of Process Plant for the Food and Chemical Industries.

Applicants must have a sound knowledge of modern production techniques combined with experience in the fabrication and welding of light copper and stainless steel. Age 30/45 years. Salary not less than £2,000 per annum. Pension and Life Assurance Schemes in operation.

Write in confidence giving full details to:

BOX No. C 929,
MACHINERY, Clifton House, Euston Road, N.W.1

PLANNING ENGINEER

Experienced Machine Shop Engineer is urgently required by a large Company manufacturing earthmoving and road construction machinery. The factory is modern and pleasantly situated in the East Midlands. Applicants must apply in own hand writing, giving full details of education and experience etc. Salary will be in relation to experience.

BOX D6

MACHINERY Clifton House Euston Road N.W.1

MACHINE TOOL SALES LTD

79, Portland Place, W.1.

have opening for fully qualified TECHNICAL SALES ENGINEER to join staff.

Main duties promotion of MARPOSS ELECTRONIC GAUGING EQUIPMENT about to be manufactured in this country under licence.

Good salary, bonus and excellent prospects.

Write only, giving full particulars.

Mechanic Required to Work on a wide variety of electro-mechanical Instrumentation and Control Equipment. Previous experience in this class of work is not essential but applicants should have some knowledge of precision or light fitting work together with a keenness to learn. The post is a permanent one in the Electricity Supply Industry. Interest in electrical or electronic devices would be an advantage. The rate of pay is £11 13s. 8d. for a 42-hour week. Sick Pay, Pension and Holiday Schemes are available after qualifying periods. Canteen and Sports Club facilities on the site.—Applications, giving details, to: STATION SUPERINTENDENT, EARLEY GENERATING STATION, Shepherds House Lane, Earley, Nr. Reading.

Foreman Required for Small factory S.W. London. Progressively minded young Engineer who should have served a good apprenticeship including toolroom and drawing office training. Experience of thread grinding an advantage. Able to control small labour force. Non-contributory pension scheme. —Apply giving details of age, education, apprenticeship, experience, to BOX C 1000, MACHINERY Clifton House, Euston Road, N.W.1.

Required to assist in

SALES DEPT.

of Machine Tool Importers and Manufacturers. Splendid opportunity for right young man, preferably one who has served apprenticeship in Engineering.

Write giving full details to

BOX C 992 MACHINERY,
Clifton House, Euston Road, N.W.1

REPRESENTATIVES

TECHNICAL REPRESENTATIVE

required for London and Southern England by progressive company expanding their range of high grade imported specialised Machine Tools. Applicant should have a thorough engineering background, initiative and personality to establish good customer relationship.

Remuneration by salary and commission. Knowledge of German and previous sales experience an advantage but not essential.

This is an interesting position with good prospects. Write in confidence giving full details to the Managing Director,

BOX C964 MACHINERY
Clifton House, Euston Road, N.W.1.

MACHINE TOOLS

A Technical Representative

is required for the Midlands by the Sales Organisation of a nationally known Group.

Applicants must have a good technical background and be resident in the Midlands. Salary according to experience and car provided.

Applications, which will be treated in strictest confidence should be sent, giving age, experience and qualifications, to—

BOX C 982 MACHINERY,
Clifton House, Euston Road, N.W.1

REPRESENTATIVE

Required for the sale of PUREFOY STANDARD PARTS for jigs and fixtures and DIE SETS; only first class man, whose ambition is to work hard and earn good money, need apply: resident in a district suitably situated to cover the main industrial areas in MIDDLESEX, ESSEX and HERTFORDSHIRE. Necessary qualifications: tenacity and loyalty, pleasing personality and good appearance, reasonable technical knowledge; must own car. Aged between 25 and 35 years. For further details apply, in writing, giving nationality, experience and all relevant particulars to

T. BROWN, Sales Manager,
PUREFOY UNIT TOOLING Ltd.,
Upper Tilt Works, Cobham, Surrey.

SITUATIONS WANTED

Technical Sales Manager. London. Does not want "Job." If you are expanding and require your share of the £100 million machine tool market—Please contact SYD. 4929 or BOX C974, MACHINERY, Clifton House, Euston Road, N.W.1.

Senior Position Required by estimating engineer specialising in the costing of special purpose machinery and associated equipment. Fully conversant with general sales procedure and able to handle projects from the initial enquiry stage through to the finalised issue of quotation to the customer.—BOX C989, MACHINERY, Clifton House, Euston Road, N.W.1.

RECEIVED TOO LATE FOR CLASSIFICATION

PLANT WANTED

Wanted, 1¾in. 5-spindle Wickman Bar Machine.—BOX C674, MACHINERY, Clifton House, Euston Road, N.W.1.

Permanent Magnetic Chucks required, size 24in. × 10in. Price and location, please, to H. WOODHILL LTD., Kelvin Road, Wallasey, Cheshire. Birkenhead 6956.

Tube Swaging Machine. Capacity ¾in. to 1in. dia. mild steel tubes, 18 s.w.g. State price, condition and age.—BOX D4, MACHINERY, Clifton House, Euston Road, N W.1.

SALES ENGINEER

Required for High-Class Line of

GRINDERS

Applicants must be between 27 and 40 years of age and have had experience in this field.

Would be required to travel country. Car provided. Excellent post for right candidate.

Write, in confidence, giving full details of qualifications and experience, to

BOX C991, MACHINERY,
CLIFTON HOUSE, EUSTON ROAD, N.W.1

Where performance is the main consideration use

LARK PNEUMATIC HAND MOTORS

Specially designed for use with high speed steel and tungsten carbide burs, having collets which hold the shank of the bur over its whole length.

Five models are available—10,000 to 100,000 r.p.m. with collets in 3, 4, 5, 8 mm., and $\frac{1}{8}$in., $\frac{3}{16}$in. and $\frac{1}{4}$in. according to size of motor.

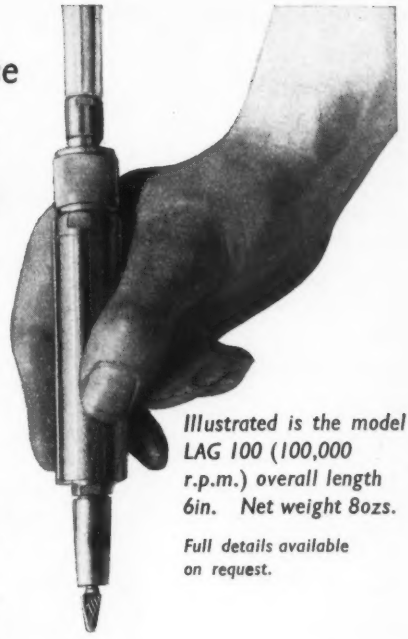
100,000 R.P.M.

H. WILLIAMS & SON LTD.

Tool Manufacturers: LARK WORKS, ST. ALBANS, HERTS

Telephone: 52264/5/6

Sole importers in the U.K. for OBERG High Speed Steel and Tungsten Carbide Burs. Also of 'Compac' and 'Parvus' gauges.



Illustrated is the model LAG 100 (100,000 r.p.m.) overall length 6in. Net weight 8ozs.

Full details available on request.

INDEX TO ADVERTISERS

	PAGE
Abbey Heat Treatments Ltd.	148
A.B.M.T.M. Ltd.	25
Abwood Machine Tools Ltd.	7
Acbars Ltd.	105 & 161
Adams, Cyril & Co. Ltd.	16
Aircraft Unit Eng'g. Co.	152
Ajax Machine Tool Co. Ltd.	129
Alexander Bros.	151
Alleyne Foster Eng. Co. Ltd.	151
Allspeeds Ltd.	80
Almco Supersheen Division of G.B. Ltd.	45
Appleyard, S. & Co. Ltd.	132
Archdale, James & Co. Ltd.	42
Ashtead Engineering Co. Ltd.	150
Atkin, W. T. (Tottenham) Ltd.	154
Atlas Copco (Gt. Britain) Ltd.	26
Automation Limited	40
Avenue Engineering Co., The	150
Aylesbury Turned Parts (True Screws) Ltd.	152
Baker, Frank & Sons Ltd.	143
Barber & Colman Ltd.	*Inside Back Cover*
Beard & Fitch Ltd.	28
Bell, H. (Machine Tools) Ltd.	160, 169 & 176
Bellows-Valvair Ltd.	118
Benton Engineering Co. Ltd., The	150
B.H.P. Machine Tool Co.	44
Boneham & Turner Ltd.	116
Bosch Ltd.	24
Brasshouse, Peter Ltd.	141
Brayshaw Tools Ltd.	99
Bridges, G. F. Ltd.	145
British Laminated Brass Co. Ltd.	135
British Oxygen Co. Ltd.	63
British Ronceray Ltd.	133
Brockhouse, J. & Co. Ltd.	128
Brooke Tool Mnfg. Co. Ltd., The	59
Broom & Wade Ltd.	121
Brown, David Corporation (Sales) Ltd., The	79
Brown's Engineering Works	150
B.S.A. Tools Ltd.	97
Buck & Hickman Ltd.	4
Buck & Ryan Ltd.	135
Burdett, G. W. S. & Co. Ltd.	109
Burton, Griffiths & Co. Ltd.	97
Butcher, Henry & Co.	159
Butterworth British Automatic Machine Tool Co. Ltd.	115
Carborundum Co., Ltd., The	37
Carne, Rudolph & Co. Ltd.	52
Cashmore, John Ltd.	162
Catmur Machine Tool Corporation Ltd.	21
Centaur Tool Works	163, 169 & 173
Centec Machine Tools Ltd.	92
Chatwin, Thomas & Co.	110
Ching, Richard & Son Ltd.	156
Clarkson (Engineers) Ltd.	61
Clayton Eng'g. Co. Ltd.	144
Cohen, Geo. Sons & Co. Ltd.	174
Coventry Grinders Ltd.	155
Cox & Danks Ltd.	82
Crawford Collets Ltd.	6
Cross Manufacturing Co. (1938) Ltd.	136
Croydon Tool & Case Hardening Specialists Ltd.	149
Delancey Tool & Engineering Works Ltd.	151
De Roll, Louis Iron Works Ltd.	127
Desoutter Bros. Ltd.	30
Dimco (Gt. Britain) Ltd.	161
Donovan Electrical Co. Ltd., The	156
Douglas, A. Co. Ltd.	158 & 168
Dover Ltd.	116
Dowding & Doll Ltd.	23, 124 & 144
Dowling, David Ltd.	135
Drummond-Asquith Ltd.	53, 74 & 75
Drummond Bros. Ltd.	53
Dunbar & Cook Ltd.	126
Dunlop Rubber Co. Ltd.	54
Duplex Electric Tools Ltd.	143
Eagle Milling Co. Ltd.	147
Eclipse Foundry & Engineering Co. (Dudley) Ltd.	149
Economic Stampings Ltd.	153
Edmonton Tool & Eng'g. Co. Ltd.	155
Edwards, Albert (Machinery) Ltd.	157 & 161
Edwards Bros.	150
Edwards, F. J. Ltd.	64, 157, 159, 160, 172 & 174
Elgar Machine Tool Co. Ltd.	39, 47, 136 & 162
Elliott, B. (Machinery) Ltd.	51 & 161
English Numbering Machines Ltd.	139
Evans, Fredk. W. Ltd.	150
Flame Hardeners Ltd.	141
Fletcher Miller Ltd.	78
Flexibox Ltd.	101
Follsain Wycliffe Foundries Ltd.	119
Forrest, W. & Co. Ltd.	159 & 163
Forst Broach Co. (G.B.) Ltd.	56
Frye Machine Tool Co. Ltd.	159 & 168
Fuller, Horsey Sons & Cassell	106
Funditor Ltd.	38

(Continued on page 180)

INDEX TO ADVERTISERS—*(continued from page 179)*

	PAGE
G.A. Precision Products Ltd.	153
Gate Machinery Co. Ltd.	163
General Engineers Supply Co. (1937) Ltd., The	156
Goulder, J. & Sons Ltd.	15
Glass Fibre Fabrications Ltd.	96
Graepel, H. Ltd.	156
Granby, Paul & Co. Ltd.	86 & 87
Gray, R. O.	167
Greenwood & Batley Ltd.	117
Griffiths, Gilbert, Lloyd & Co. Ltd.	114
Grimston Electric Tools Ltd.	126
G.R.M. Heat Treatments Ltd.	149
Grosvenor Works (Holloway) Ltd.	154
Habit Diamond Tooling Ltd.	49
Haesler Sales	146
Hammond Eng'g. Co. Ltd., The	155
Harper, John & Co. Ltd.	13
Harvey, G. A. & Co. (London) Ltd.	48
Harvey-Hood Eng'g. Co. Ltd	148
Headland Eng'g. Developments Ltd.	132
Hedges Reinforced Plastics Ltd.	146
Heliot	172
Henderson & Keay Ltd.	77
Herbert, Alfred Ltd.	17 & 19
High Frequency Heat Treatment	149
High Speed Service Tool Co. Ltd.	149
Highbury Metal Spinning Co. (1955) Ltd.	153
Holly Engineering (Drayton) Ltd.	154
Hopkinsons Ltd.	139
Hughes Engineering Co. (Leicester) Ltd.	150
Humphreys, J. H. & Sons Ltd.	136
Hunt, Herbert & Sons Ltd.	137
Huntley & Sparks Ltd.	151
Hurlock, Wm. Jnr. Ltd.	176
Ide, C. F. Engineering Ltd.	146
Ideal Hardening Co. Ltd.	148
Imperial Chemical Industries Ltd.	12
Impregnated Diamond Products Ltd.	46
Industrial Trading Co. Ltd.	156
Jardine, John Ltd.	149
J.B. Machine Tool Co. Ltd.	158 & 161
Johansson, C. E. Ltd.	88
Jones, A. A. & Shipman Ltd.	102 & 113
Jones, E. H. (Machine Tools) Ltd.	158 & 160
Kayser Ellison & Co. Ltd.	93
K. & C. Machinery Ltd.	170
Keelavite Hydraulics Ltd.	5
Keir, Alan Ltd.	149
Kelly, R. & Sons Ltd.	159 & 168
Kemp Precision Tooling Ltd.	154
Kempsafe Oil Burners Ltd.	138
Kenworthy Jig & Press Tool Co. Ltd.	154
Kenilworth Mnfg. Co. Ltd., The	145
K.E.N.T. Machinery & Engineering Co.	164
Kinnings, Arnold & Sons Ltd.	104
Kirk, Harry Eng'g. Ltd.	164
Kitchen, A.-D. Walker Ltd.	106
Kneller (Instrument & Tools) Ltd.	81
Lancing Machine Tools Ltd.	111
Landen (Engineers) Ltd.	147
Lang, John & Sons Ltd.	25
Lattimer, E. R. Ltd.	152
Lawrence, A. & Co. (Machine Tools) Ltd.	157 & 161
Layton, M. C. Ltd.	158
Lee, Arthur & Sons Ltd.	55
Lees Hall & Sons Ltd.	150
Lench, Thos. Wm. Ltd.	122
Lenches (Birmingham) Ltd.	114
Leyton Eng'g. Co. Ltd.	150
Leytonstone Jig & Tool Co. Ltd.	22
Liberty Eng'g. Supplies Ltd.	164
Lines, J. H. Ltd.	144
MacDowall Equipment Co. Ltd.	154
MacEchern & Co. Ltd.	148
Machine Shop Equipment Ltd.	95
Marbaix, Gaston E. Ltd.	108
Marsden & Shiers Ltd.	153
Marsden, W. G. Engineering Ltd.	151
Martin Bros. (Machinery) Ltd.	168
Martonair Ltd.	103
Maun Industries Ltd.	143
Maysmith Eng'g. Co. Ltd.	155
Meddings, W. J. Ltd.	27 & 69
Mek-Elek Engineering Ltd.	134
Melbourne Eng' Co. Ltd.	122
Mercantile Credit Co. Ltd.	100
Midland Machine Tool Co., The	172
Millen, Edwin & Sons Ltd.	157 & 176
Mills, George (Engineers) Ltd.	149
Modern Machine Tools Ltd.	173
Monks & Crane Ltd.	134
Mortimer Engineering Co. Ltd.	144
Mortimer Machine Tool Co. Ltd.	43
Moser Cams & Tools Ltd.	134
Murray's (Pretoria) Eng'g Co. Ltd.	140
Naish Bros. & Co. Ltd.	153
Neill, James & Co. (Sheffield) Ltd.	*Inside Front Cover* & 68
Nettlefold & Moser Ltd	20
Newall Group Sales Ltd.	3
Newall Used Machine Division	160
Newman Industries Ltd.	158 & 163
Nickols Automatics Ltd.	128
Nielsen, F. C. & Son	156
Norton Grinding Wheel Co. Ltd.	*Back Cover*
Norton, T. & Co. Ltd.	118
Norton, W. E. (Machine Tools) Ltd.	165
Novogage Ltd.	149
O.K. Trading (B'ham Factors) Ltd.	156
Osborn, Samuel & Co. Ltd.	84
Parkes (Machine Tools) Ltd.	173 & 176
Parkin, F. M. (Sheffield) Ltd.	94
Peak Eng'g. Ltd.	8 & 9
Pidgen Bros. Ltd.	166
P.M.T. (Machine Tools) Ltd.	175
Polarcold Ltd.	153
Polistor Ltd.	176
Pollard, Fredk. & Co. Ltd.	72
Pratt, F. & Co. Ltd.	57
Pratt, Levick & Co. Ltd.	11
Precision Heating Ltd.	148
Precision Products (Romford) Ltd.	147
Pultra Ltd.	137
Raistrick, J. E. Ltd.	158
Rawlplug Co. Ltd., The	*Inside Back Cover*
Rayner, Peter Ltd.	146
Redcar Eng'g. Co. Ltd.	152
Reliant Design Co. Ltd.	147
Renold Chains Ltd.	83
Revolving Centres Ltd.	134
R.J.H. Tool & Equipment Co. Ltd., The	138
Rockwell Machine Tool Co. Ltd.	33, 34, 35, 36 & 142
Rodger, Setterington & Ptns.	147
Rodgers Bros. Ltd.	146
Rollo Industries Ltd.	130
Rolls Tools Ltd.	171
Rotax Ltd.	10
Roth, L.	164
Rowland, F. E. & Co. Ltd.	60
Rubert & Co. Ltd.	144
Ryder, Thomas & Son Ltd.	2
Rye, Claude Bearings	155 & 157
Sanderson Bros. & Newbould Ltd.	32
Sandvik Swedish Steels Ltd.	62
Schrader's Son, A.	81
Scottish Machine Tool Corp. Ltd.	50
Selson Machine Tool Co. Ltd., The	41
Seton Creaghe Engineering Ltd.	147, 149 & 152
Shand, J. H. Ltd.	120
Sheet Metal Machinery Co. Ltd.	140
Sheffield Twist Drill & Steel Co Ltd., The	89
Shell-Mex Ltd.	70 & 71
Shelmerdine & Mulley Ltd.	152
Simmonds Aerocessories Ltd.	107
Slingsby, Walter & Co. Ltd.	156
Smith & Grace Ltd.	136
Smith & Netherwood Ltd.	152
Song Machine Tools Ltd.	166, 169 & 174
Solex (Gauges) Ltd.	98
Southern Engineering & Machinery Co. Ltd.	158
Spectra Chemicals Ltd.	73
Spring Steel Productions Ltd.	132
Staines Machine Tool Co. Ltd.	170
Stalker Drill Works Ltd.	131
Stancroft Ltd.	158, 164 & 176
Stephens, R. & Son Ltd.	154
Stevens & Bullivant Ltd.	82
Stubs, Peter Ltd.	99
Sussex Rubber Co. Ltd.	142
Sykes Machine Tool Co. Ltd.	29
Tate Machine Tool Co. Ltd.	159, 166 & 170
Taylor & Jones Ltd.	110
Tecalemit Ltd.	76
Thoka Machinery Supplies Ltd.	123
Thompson, Joseph (Sheffield) Ltd.	112
Thompson, Michael S. Ltd	180
Times Machinery Co. Ltd.	104
Trevena & Glover Ltd.	153
Turner, G. H. & Co. Ltd.	140
Try, Gordon Ltd.	102
Try, Thos. Ltd.	102
Universal Ball Bearing Co.	155
Valley Products (Lye) Ltd	138
Vaughan Associates Ltd.	*Front Cover*
Veraloy Products Ltd.	58
Victa Engineering Co.	108
Visual Planning Systems Ltd.	138
Wadkin Ltd.	125
Ward, M. (Machine Tools) Ltd.	158 & 162
Ward, Thos. W. Ltd.	174
Webb, R.	151
Weeks & Wilson Ltd.	92
West Green Tool Co.	155
Westool Ltd.	90 & 91
White, Thos. & Sons Ltd.	18
Whiteley, Wm. & Sons Ltd.	14
Wickman Ltd.	85
Widdowson, Herbert & Sons Ltd.	65, 66, 67 & 170
Wigglesworth, Frank & Co. Ltd.	142
Wild-Barfield Electric Furnaces Ltd.	1
Williams, H. & Son Ltd.	179
Windley Bros. Ltd.	130
W.J.L. (Machinery) Ltd.	155
Worson Die Cushions Ltd.	145
Young, John S. & Co. Ltd.	124
Zephyr Cams Ltd.	151
Zwicky, G. (London) Ltd.	112

Write to Thompson's for details of :—

THE WORLD'S FINEST *KEYLESS* DRILL CHUCKS

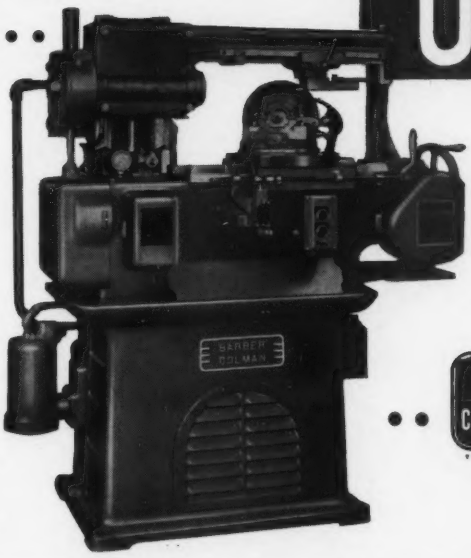
SUPRA GENERAL PURPOSE — **ROHM** — **SPIRO** HIGH PRECISION

Sole Importers— MICHAEL S. THOMPSON LIMITED

185-187 HAMMERSMITH ROAD, LONDON, W.6. RIVERSIDE 7922-3. GRAMS: TOMTOOL, LONDON, W.6.

British Built **BARBER-COLMAN HOBBER** **No. 6-10**

Hobs, spurs, helicals, splines, serrations and special forms of 12 D.P. and finer. Ease of set-up makes the 6-10 suitable for long or short runs.



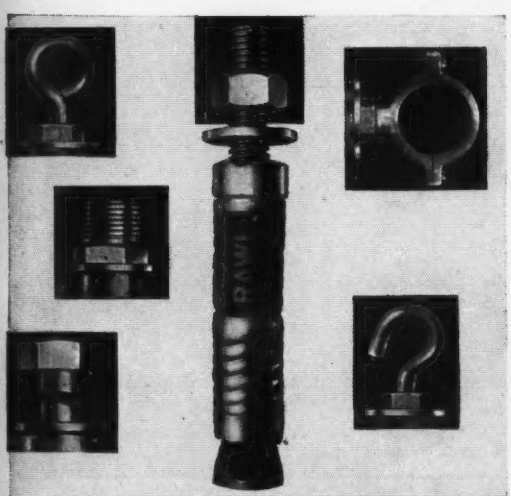
CAPACITY:

SPUR AND HELICAL	12 DP AND FINER
BLANK DIAMETER	UP TO 6in.
MAX. TRAVEL OF HOB SLIDE	10¼in.
MAX. SWIVEL ANGLE SETTING	60°R, 90°L
HOB SPEEDS (STANDARD)	133/533 R.P.M.

COLMAN
TRADE MARK

BARBER & COLMAN LTD
BROOKLANDS, Sale, Cheshire.
Phone: Sale 2277 Grams & Cables: 'Barcol Sale'

6 HEADS are better than one!



1 Loose Bolt Rawlbolt
2 Pipehanger Rawlbolt
3 Eye Rawlbolt
4 Bolt Projecting Rawlbolt
5 Rawlbolt fitted with Pipe Clip
6 Hook Rawlbolt

You never need to improvise with Rawlbolts. There are types exactly right for every bolt-fixing job, No. 5, for example, for the support of pipework, and No. 2 for use with Pipe-hangers and other gas fittings. Hook and Eye Rawlbolts (Nos. 3 and 6) have many uses, such as providing anchorage for guy ropes and cables, supporting suspended ceilings, etc. There's the Loose Bolt Rawlbolt (No. 1), inserted after the machine is slid into position, and the Bolt Projecting Type (No. 4), ideal for wall-fixings.

Rawlbolts give you bolt-fixings of enormous strength in a fraction of the time taken by any other method.

Every bolt-fixing job is far quicker with

RAWLBOLTS

B580

RAWLPLUG

THE RAWLPLUG CO. LIMITED
CROMWELL ROAD · LONDON · S.W.7

Test Behr-Manning Fibre Discs on your grinding job

Naturally we are confident in the quality of Behr-Manning Speed-Wet Metalite Fibre Discs. We know that they have extra "built-in" toughness. We know that the hard, sharp grit is double-anchored to the sturdy fibre backing with thermo-setting resins that are immune to heat. We know that they make quick work of the toughest grinding job. But there is only one way for *you* to find this out — try one on your own job. Fill in the coupon below and post it back to us and we will soon show just what Behr-Manning Fibre Discs can do for *you*.

BEHR-MANNING Coated Abrasives

*

Marketed in the U.K. by their associated company

NORTON ABRASIVES

NORTON GRINDING WHEEL CO. LTD.

COATED ABRASIVES DIVISION · WELWYN GARDEN CITY · HERTFORDSHIRE

Telephone: Welwyn Garden 23484 (15 lines)

NORTON and BEHR-MANNING factories also in Argentina, Australia, Brazil, Canada, France, Germany, Italy, Northern Ireland, South Africa and U.S.A.

*Trade Mark of Norton Company U.S.A.—the World's largest manufacturer of abrasive products.

N180

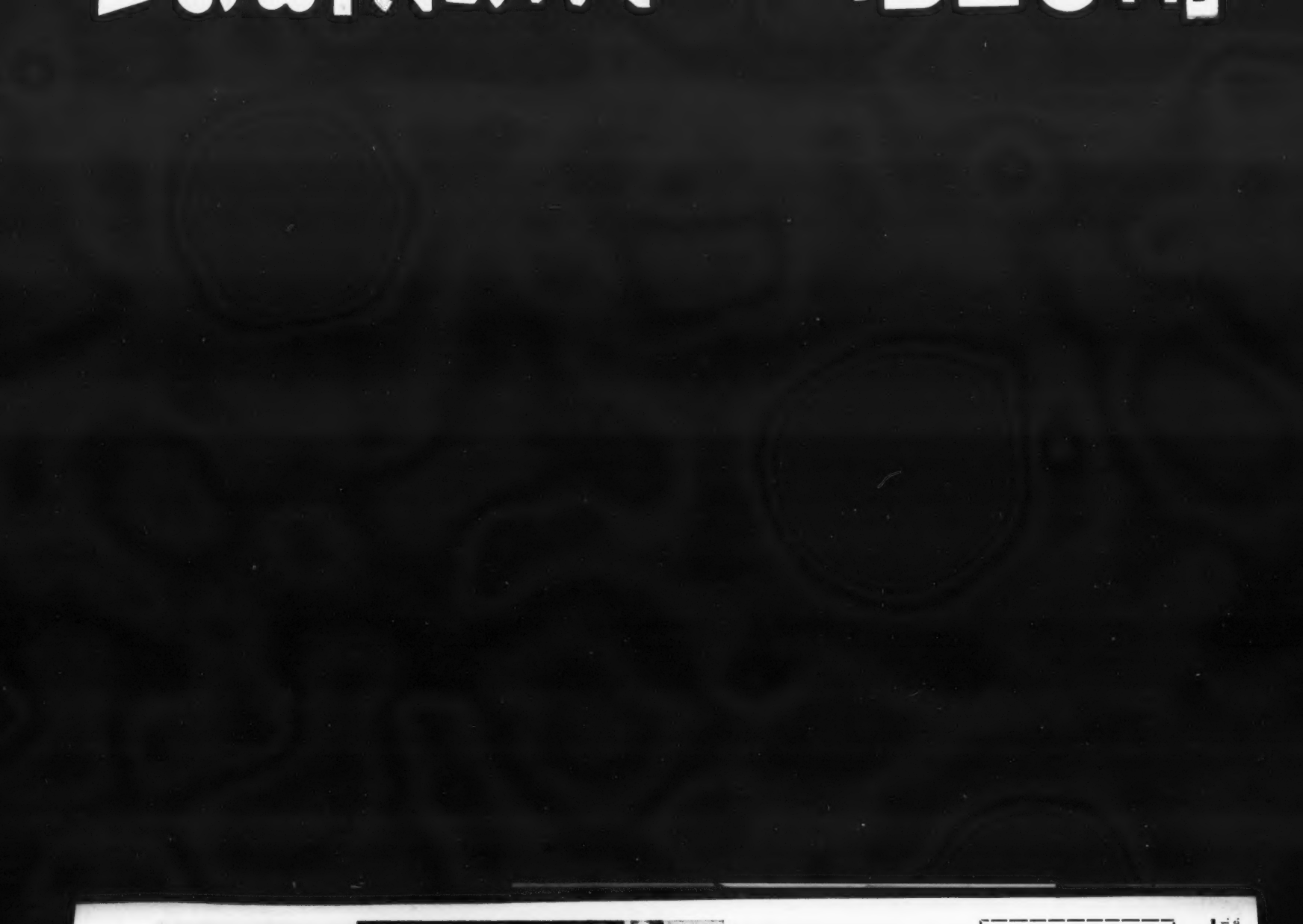
Please arrange for your representative to call and demonstrate Behr-Manning Fibre Discs.

NAME _____

NAME OF COMPANY _____

ADDRESS _____

_____

Position _____

Published by THE MACHINERY PUBLISHING CO., LTD., at their Office, Clifton House, 83-117, Euston Rd., London, N.W.1. Telephone Euston 8441.
LONDON: HARRISON & SONS, LTD., by Appointment to Her Majesty The Queen, Printers, London, Hayes (Middx.) and High Wycombe.